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SCATHA Atlas Data Base, Volume II

Editors:

E. G. MULLEN
M. S. GUSSENHOVEN

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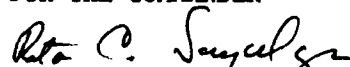
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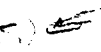
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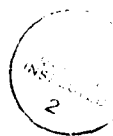
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4. INTRODUCTION

The P78-2 SCATHA satellite was launched on 30 January 1979 and inserted into a 5.3×7.8 RE (RE = 1 Earth radius), low inclination (7.9°) orbit with an easterly drift rate of about 5° per day. The satellite is spin stabilized at approximately 1 rpm with the spin axis of the satellite located in the orbital plane of the satellite and normal to the Earth-sun line. Because of the drift and eccentricity of the orbit, the satellite passes through each altitude at varying local times (LT) and varying magnetic latitudes.

The SCATHA Atlas was prepared in 1983⁵ in order to specify those aspects of the space environment in the near-geosynchronous region that contribute to spacecraft charging. The key data for the Atlas were the magnetic field data, the common mode of the electric field experiment and particle data from four instruments, covering the energy range from approximately 10 eV to 2 MeV for electrons and ions from approximately 100 eV to 30 keV for singly ionized Oxygen and Hydrogen.

The Atlas data were taken mainly during 1979 and the first part of 1980. To accomplish the statistical studies in the Atlas, survey plots of much of the data were produced. The survey plots are presented here in two volumes. In the first volume we present the magnetometer data and the common mode electric field data. In the second volume we present the particle data. All data are plotted against Universal Time. Some of the data plots are annotated rather completely with ephemeris, others have only Universal Time. The magnetometer data is the most completely annotated and is presented for the greatest number of days. It can be used to provide ephemeris for most of the other data.

The volumes are organized in the following way. For each data set we give 1) a brief description of the instrument from which the data were collected; 2) calendar on which the days that data presented are marked; 3) description of the format in which the data are presented; 4) the data, presented in chronological order, one day per page.

(Received for publication 1 September 1989)

⁵Mullen, E.G. and Gussenhoven, M.S. (1983) *SCATHA Environmental Atlas*, AFGL-TR-83-0002, 169 pp.
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5. LOW ENERGY PLASMA DATA BASE, SC9

5.1 Instrument Description

The University of California, San Diego Charged Particle Experiment, built and operated under the direction of E.C. Whipple, is similar to that flown on the ATS 6 satellite⁶. It consists of an array of five electrostatic analyzers: three to measure ions and two to measure electrons. The analyzers are configured as two pairs of electron and ion sensors, each mounted in a separate rotating assembly, and a single ion detector mounted with a fixed look direction relative to the satellite. The two rotating assemblies sweep out pitch angles in the spin plane of the satellite and in an orthogonal plane containing the spin axis, respectively. The fixed ion detector also samples in the spin plane. One pair of detectors measures particles with energies from 1 eV to 81 keV. The other three detectors cover an energy range from 0.1 eV to 2 keV. All sensors have an energy resolution of 20% and return a 64-point spectrum over their energy ranges in 16 s. The experiment is normally operated to complete an energy scan and then dwell between 2 and 128 s at a fixed energy.

5.2 Description of Data Presentation: SC9 Low Energy Plasma

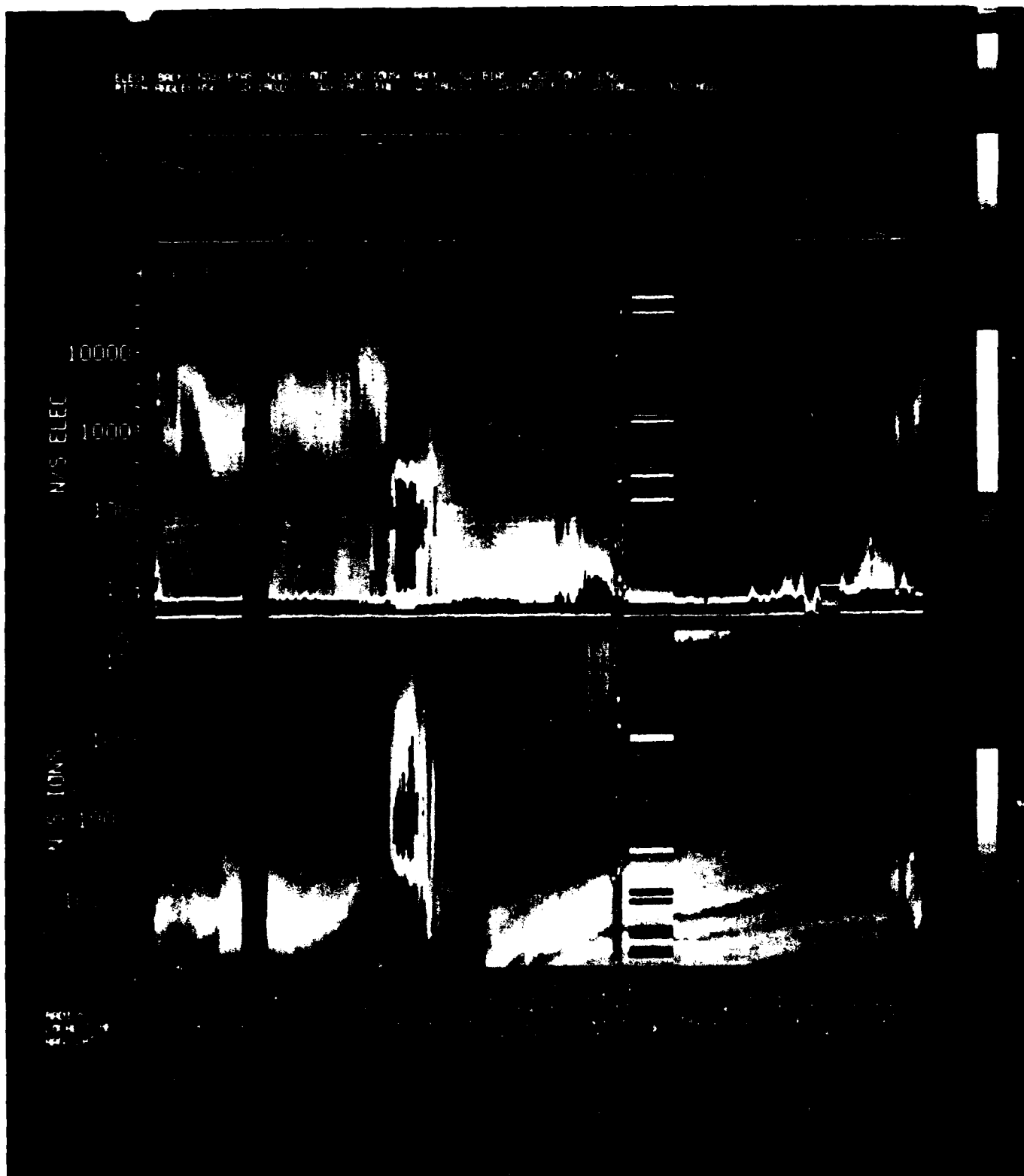
In each Figure the SC9 data are presented in a spectrogram format as a function of Universal Time for a 24-hour period. The particle flux is presented in grey-scale as a function of energy (vertical axis) in eV. The energy scale is logarithmic. Electron data are plotted in the top panel with energy increasing upward. The ion data are in the bottom panel with energy increasing downward. In addition to UT, the ephemeris include the distance of the satellite from the center of the Earth in RE (Earth radius), Local Time, and the Magnetic Latitude of the satellite.

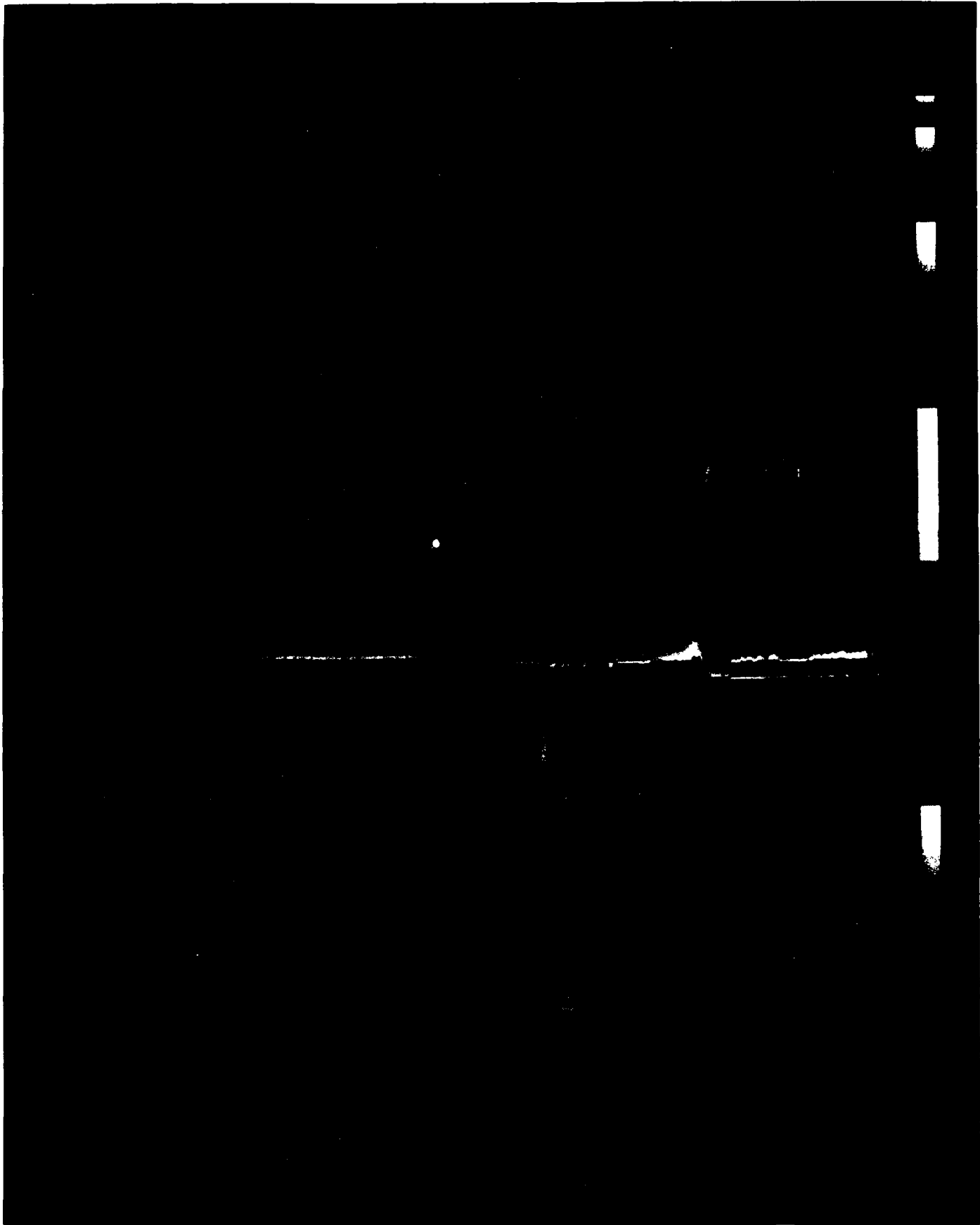
⁶Mauk, B.H., and McIlwain, C.E. (1975) ATS-6 UCSD auroral particles experiment, *IEEE Trans. Aerosp. Electron. Syst.*, AES-11:1125.

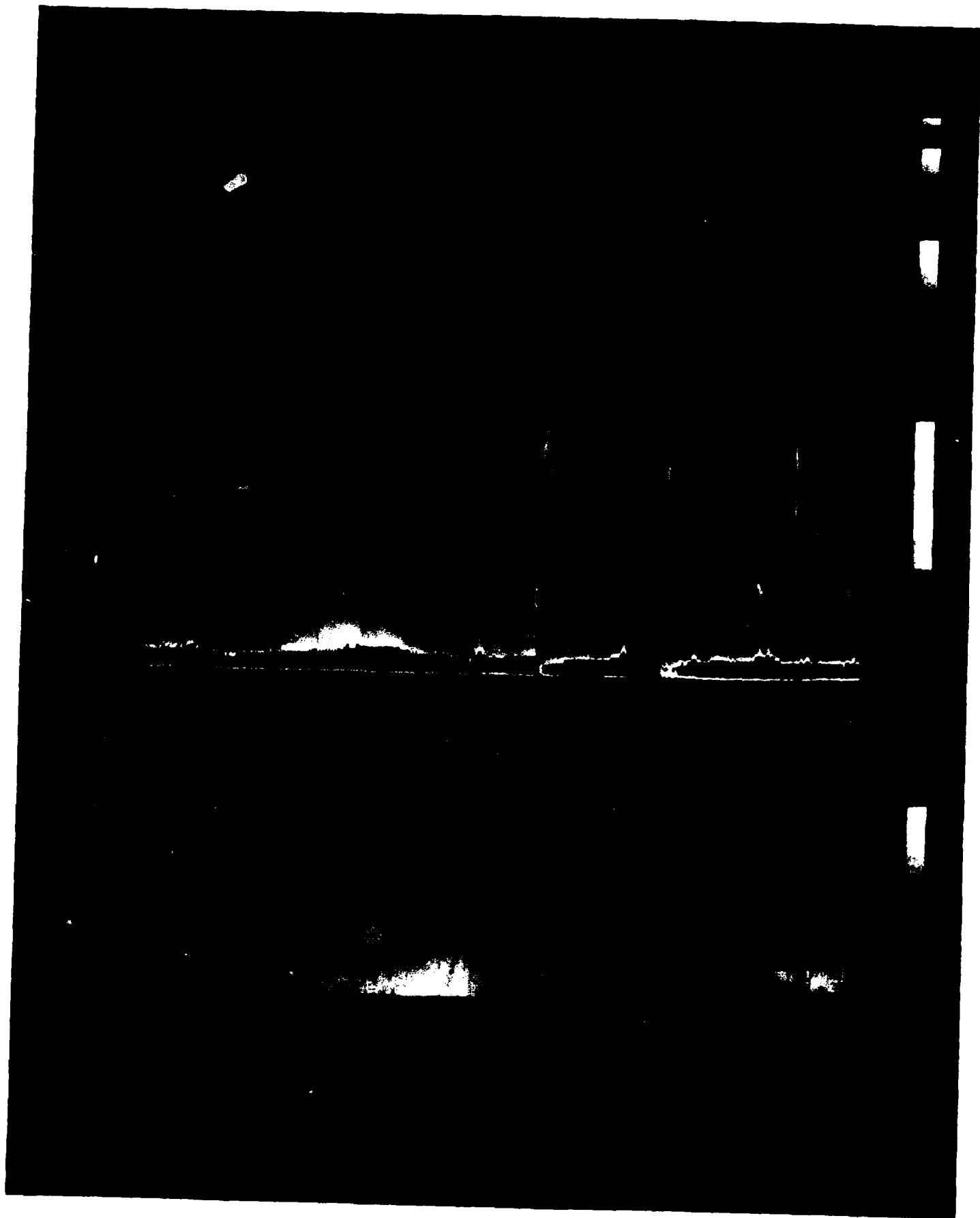
5.3 Calendar of Days for which SC9 Low Energy Plasma Data are Presented

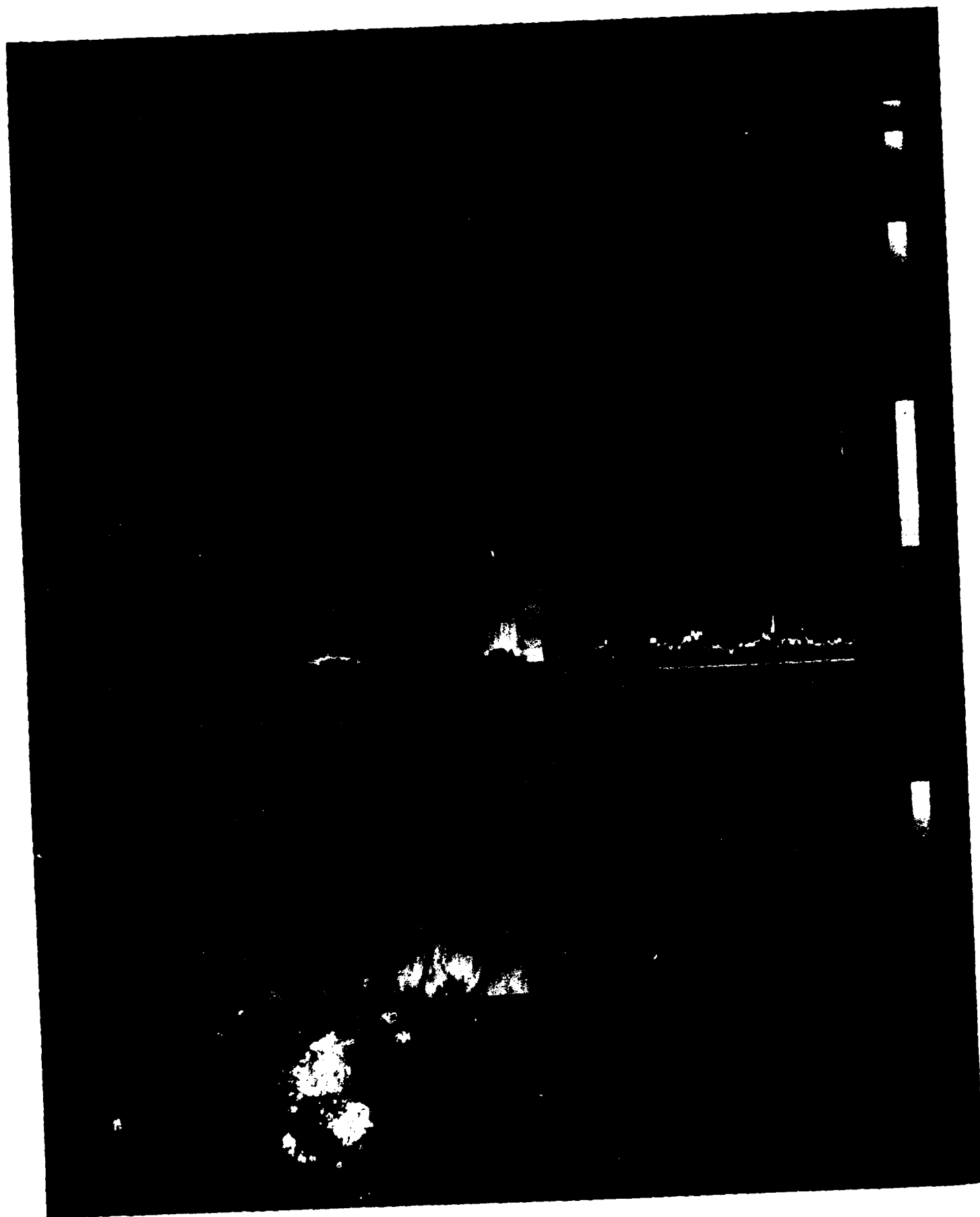
| 1979 | | | | | | | | | | | | 1980 | | 1981 | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|------|-----|------|-----|-----|
| DAY | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | | JAN | FEB | MAR | APR | DAY |
| 1 | | | 121 | | | | | | | | | | | | 091 | 1 |
| 2 | | | | | | | | | | | | | | | 092 | 2 |
| 3 | | 093 | | | | | | | | | | | | | | 3 |
| 4 | | 094 | | | | 216 | | | | | | 004 | | | | 4 |
| 5 | | 095 | | 156 | | | | 278 | | | | | 036 | | | 5 |
| 6 | | | | 157 | | | | | | | | | 037 | | | 6 |
| 7 | | | 127 | 158 | 188 | | | 280 | 311 | | | | | 066 | | 7 |
| 8 | | | | | | | | 281 | | | | | | | | 8 |
| 9 | | | | 160 | | | | 282 | | | | | | | | 9 |
| 10 | | | | | | | | | | | | | | | | 10 |
| 11 | | | | | | | 254 | | | | | | 042 | | | 11 |
| 12 | | | | | | | | | | | | 012 | | 071 | | 12 |
| 13 | | 103 | | | | 225 | | | 317 | | | | | 072 | | 13 |
| 14 | | | | | | 226 | | | | | | | | 073 | | 14 |
| 15 | | | | 166 | | | | | 319 | | | | 046 | | | 15 |
| 16 | | | | | | | | | | | | | 047 | 075 | | 16 |
| 17 | 076 | | | 168 | | | | | | 351 | | | | 076 | | 17 |
| 18 | | 108 | 138 | | | | 261 | | | | | 018 | | 077 | | 18 |
| 19 | | | | | 200 | | 262 | | | | | | | | | 19 |
| 20 | | 110 | | | | 232 | | | | | | | | 079 | | 20 |
| 21 | 080 | 111 | | 172 | | | 264 | | | | | | | | 111 | 21 |
| 22 | | | | | | | | | | | | | | | 112 | 22 |
| 23 | | | | | | | | | | 357 | | | | 082 | 113 | 23 |
| 24 | | 114 | 144 | | | | | | 328 | | | | | | | 24 |
| 25 | | 115 | 145 | | 206 | | | | 329 | 359 | | | | | | 25 |
| 26 | | | 146 | | | | | | | | | | | 085 | | 26 |
| 27 | | | | 178 | | | | | 331 | 361 | | 027 | | 086 | | 27 |
| 28 | 087 | | | | | | 271 | 301 | | | | 028 | | 087 | | 28 |
| 29 | 088 | | 149 | 180 | | 241 | 272 | | | 363 | | | | 088 | | 29 |
| 30 | | 120 | | | | | 273 | | | | | | | 089 | | 30 |
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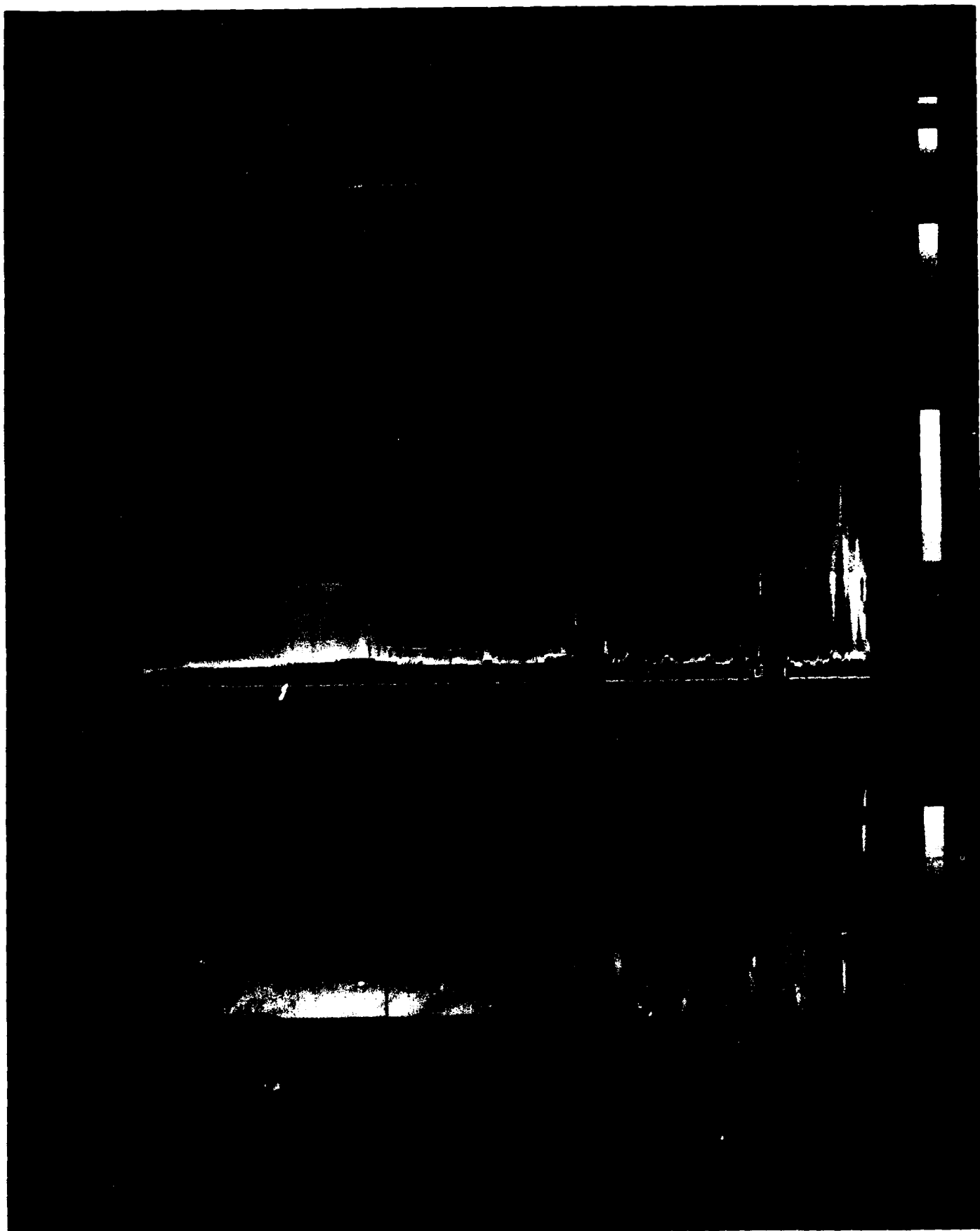
5.4 Data Presentation; SC9 Low Energy Plasma

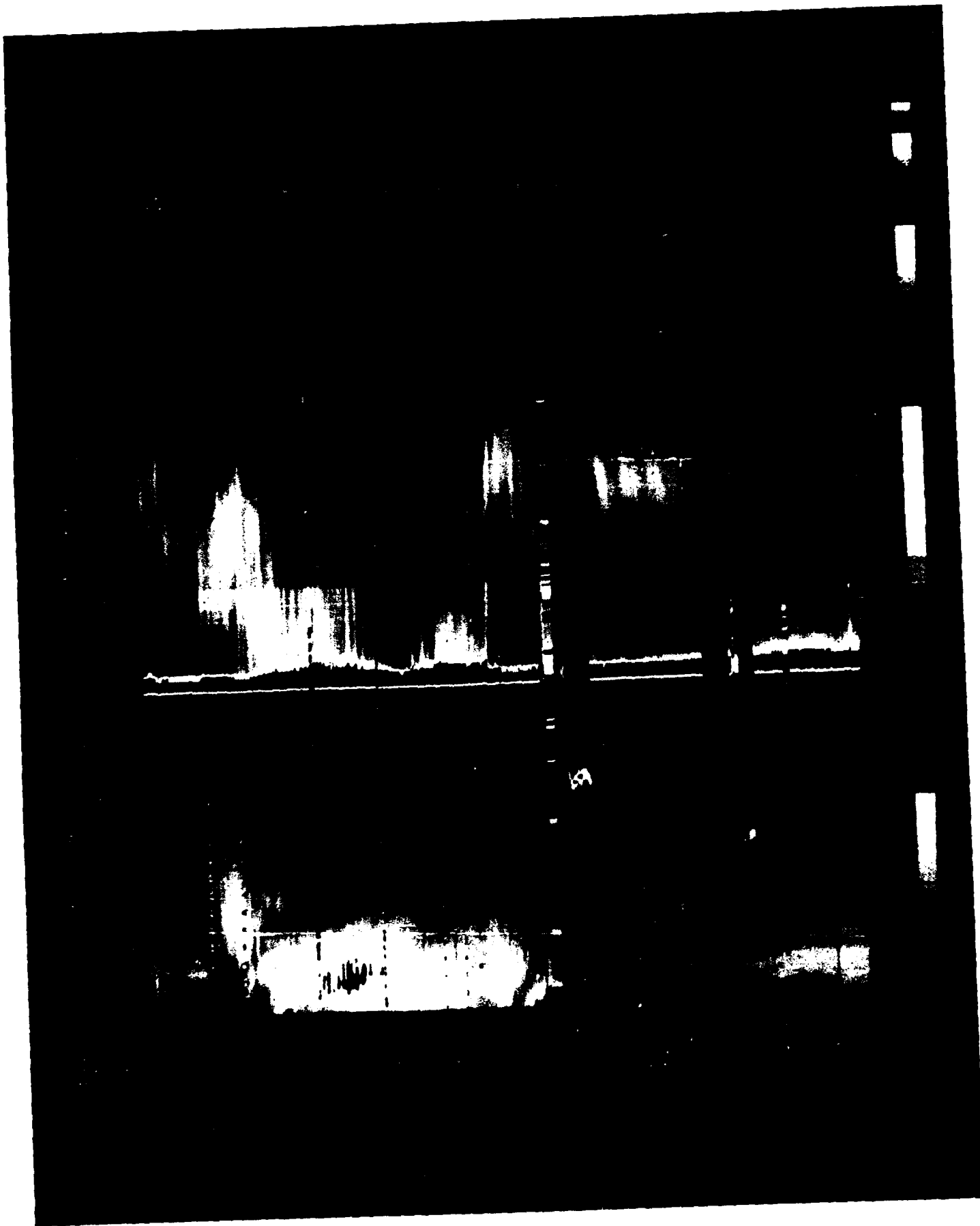


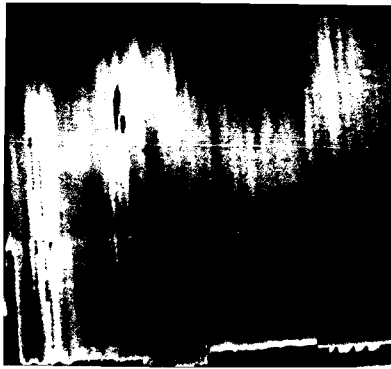


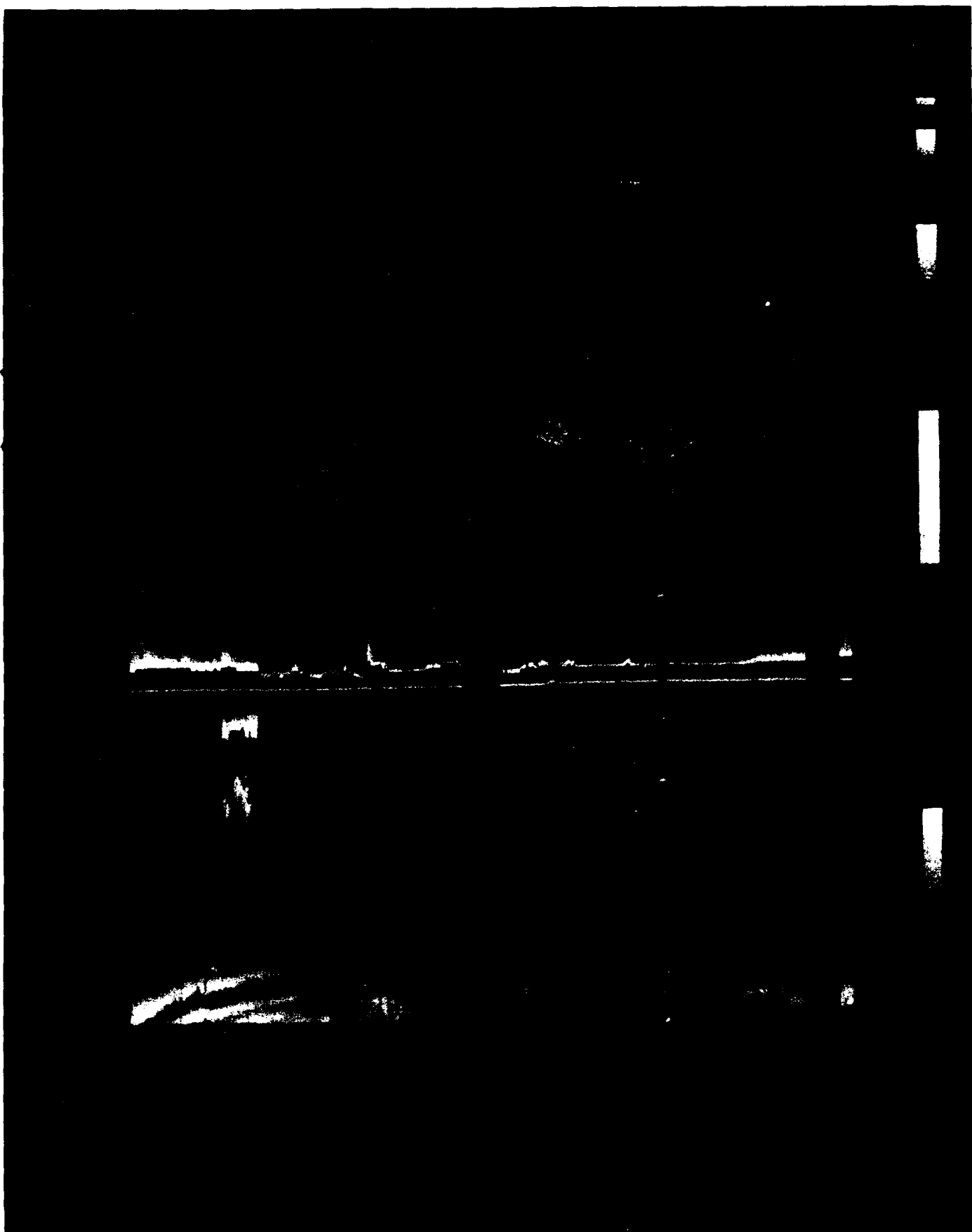


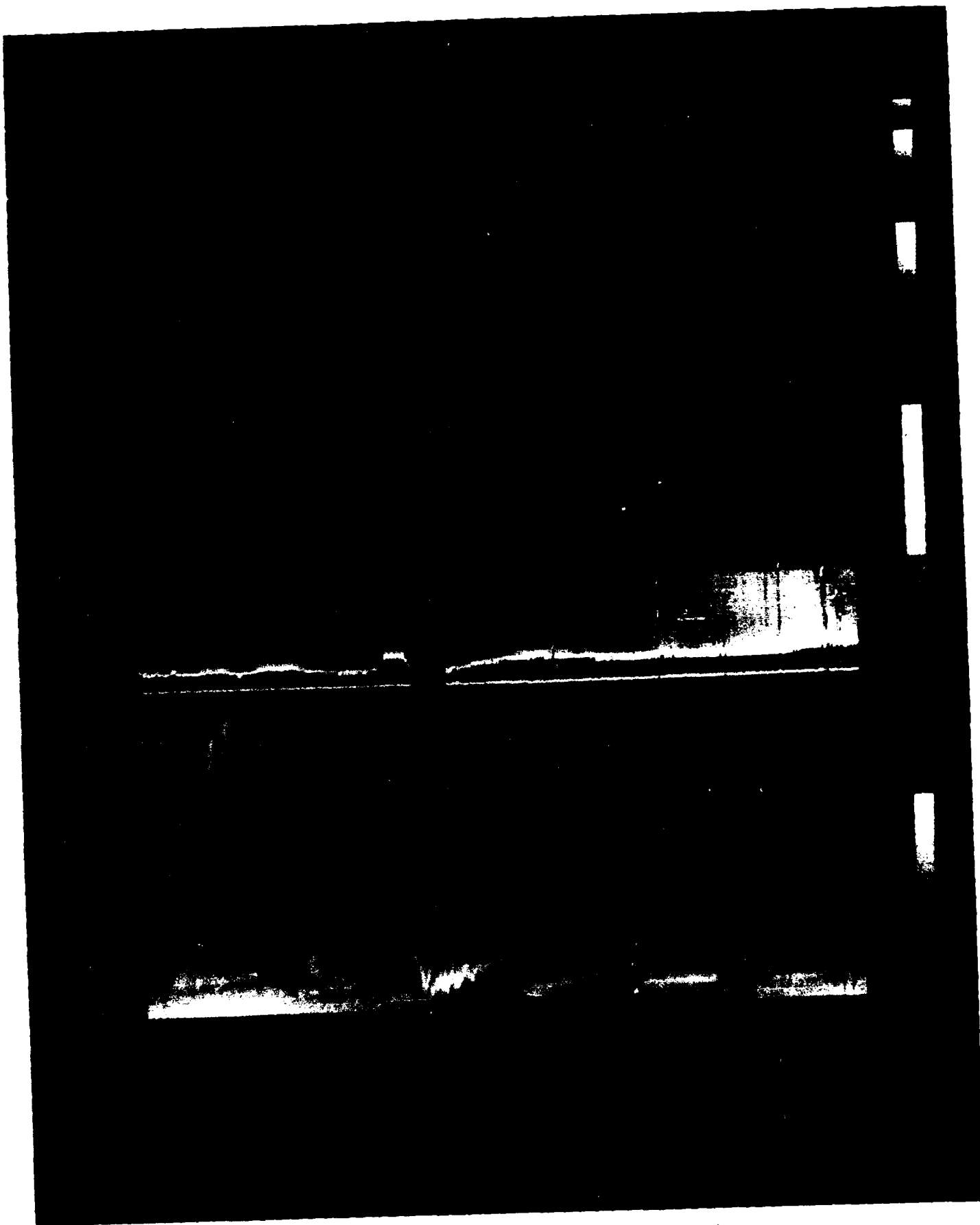


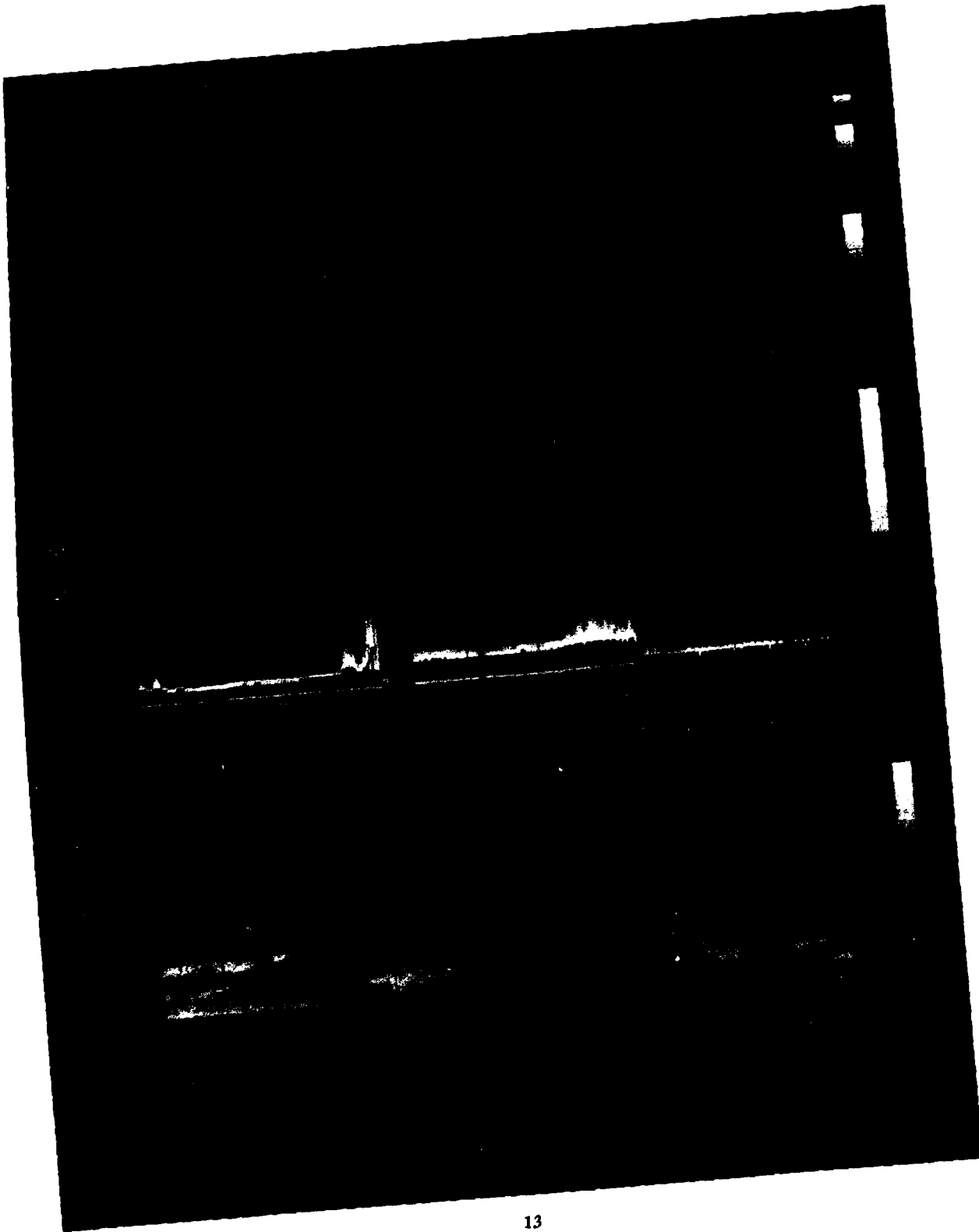


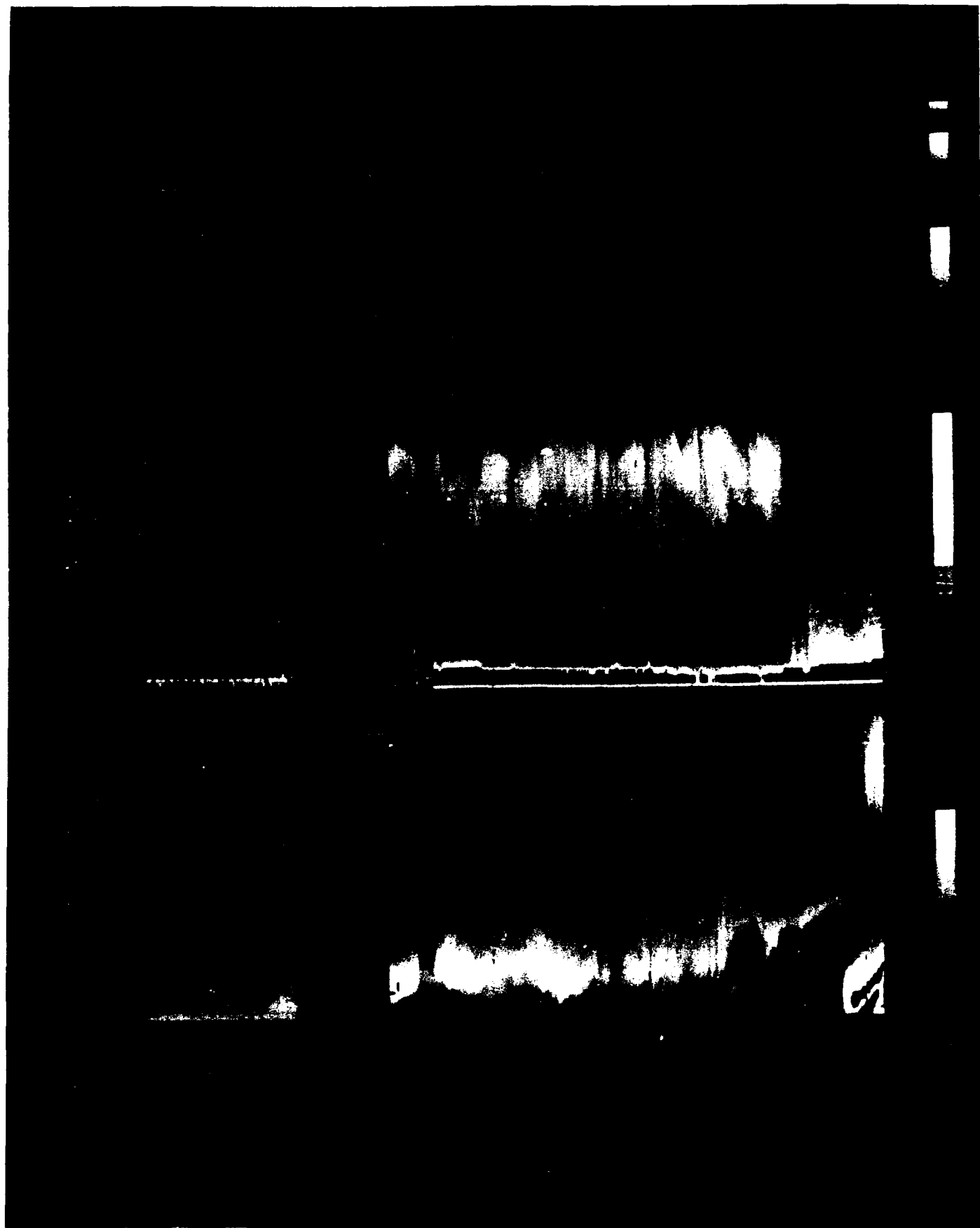


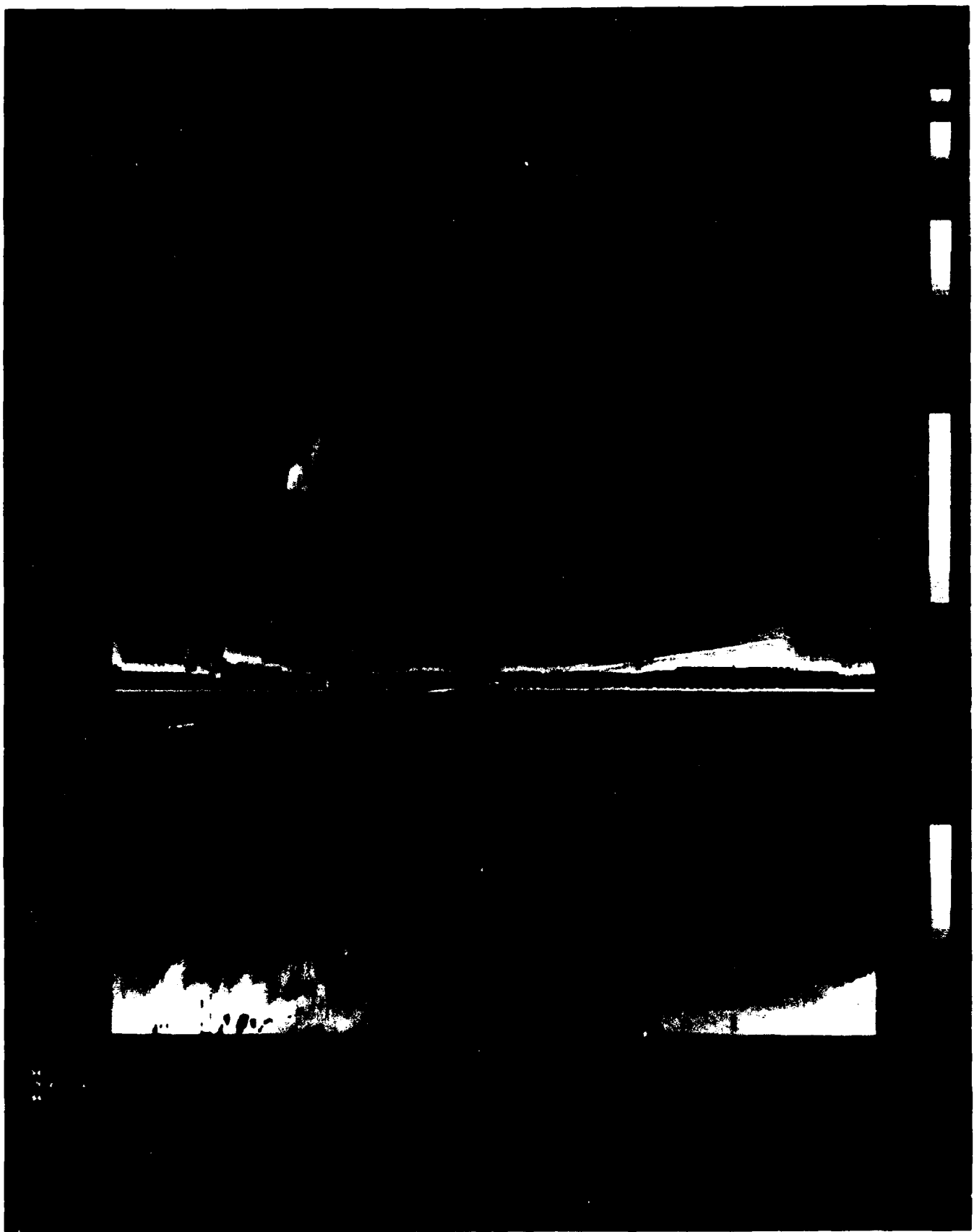


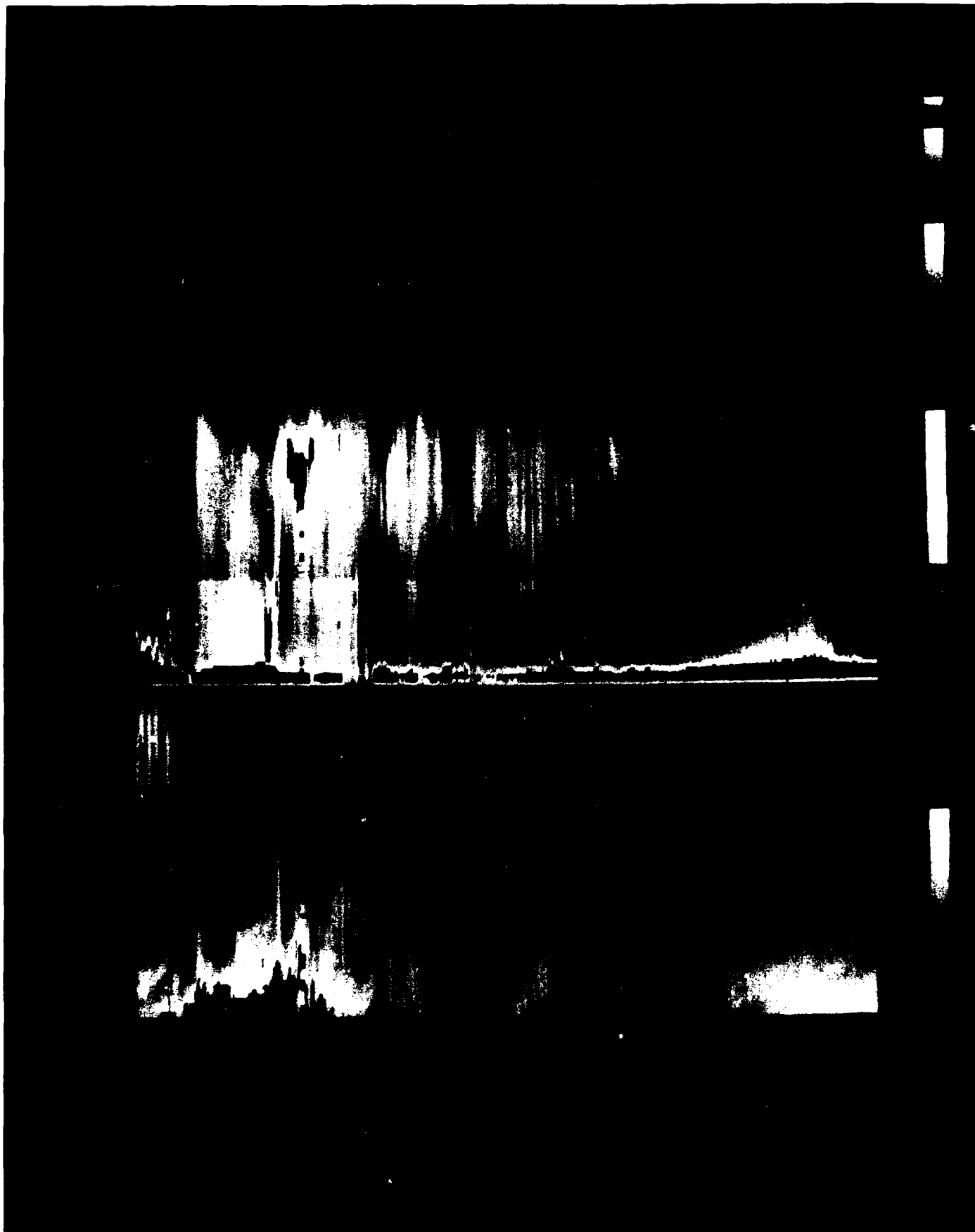


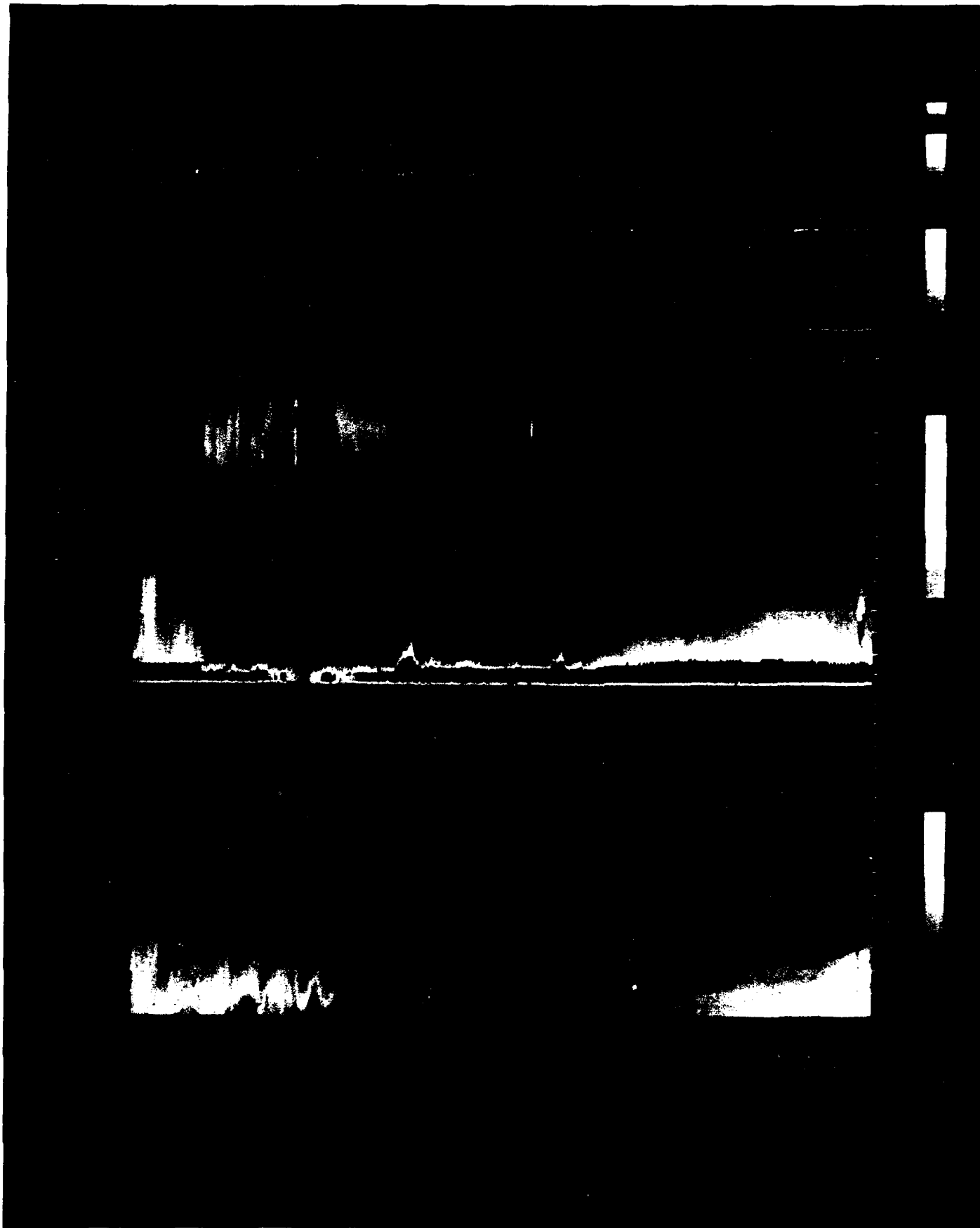


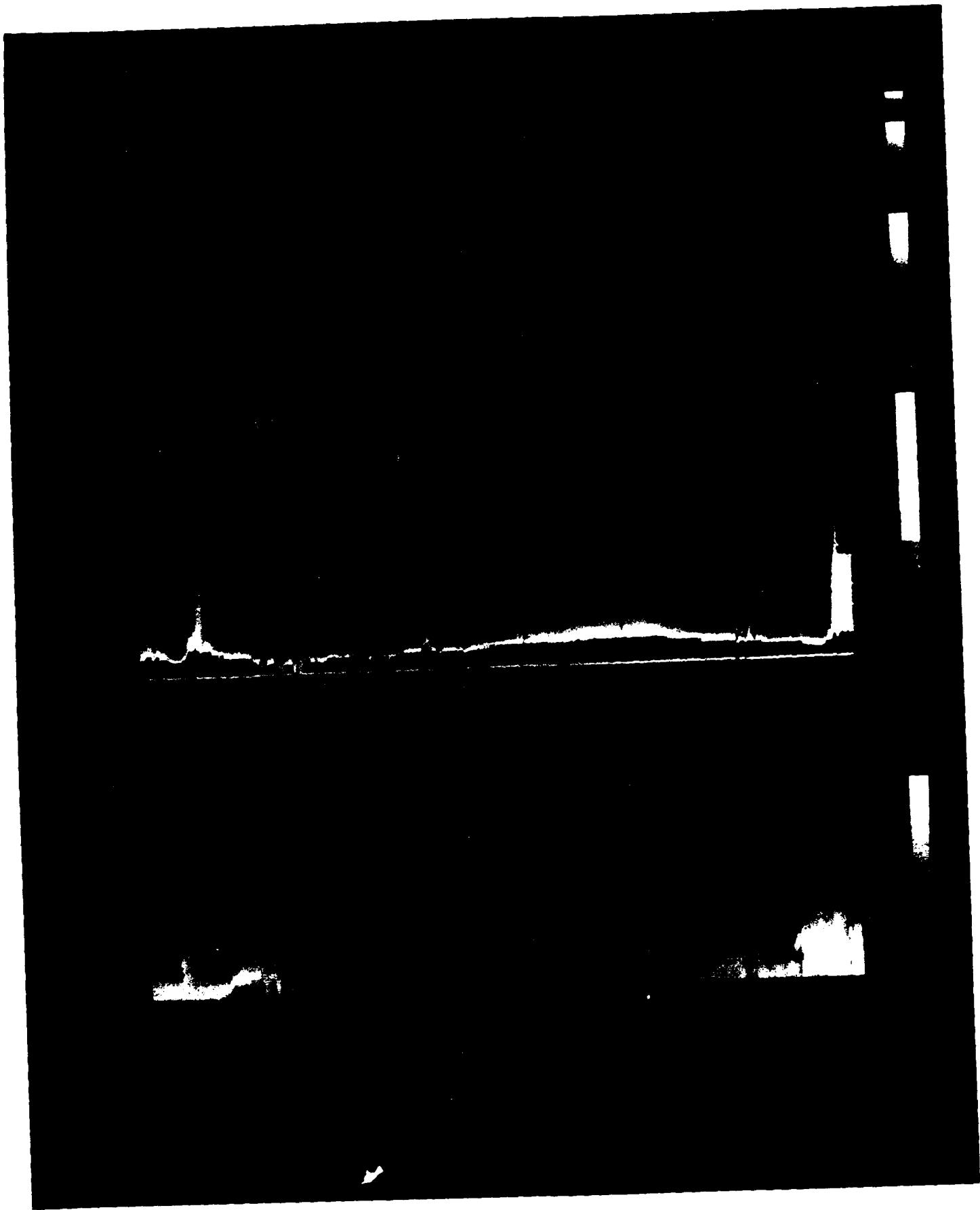


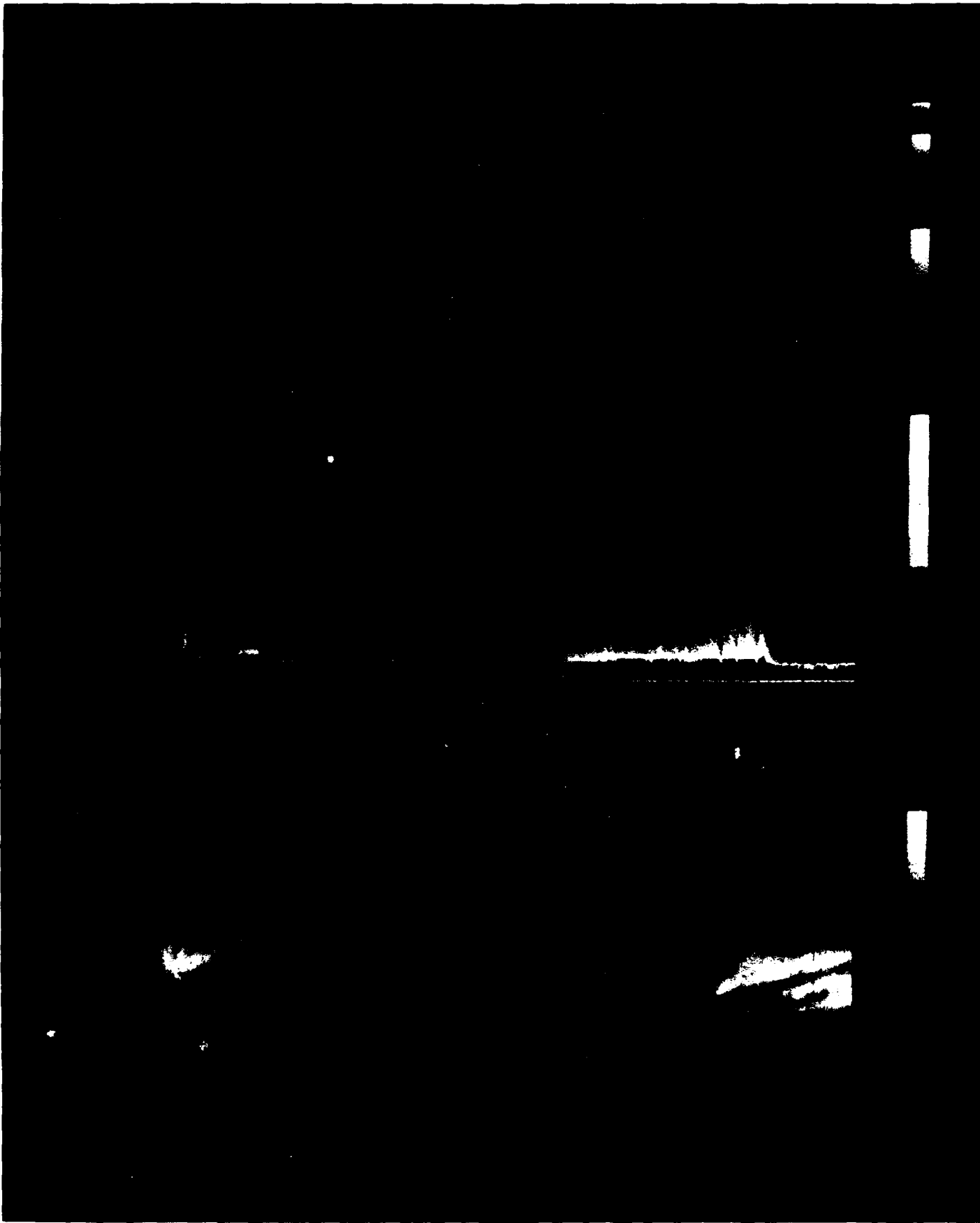


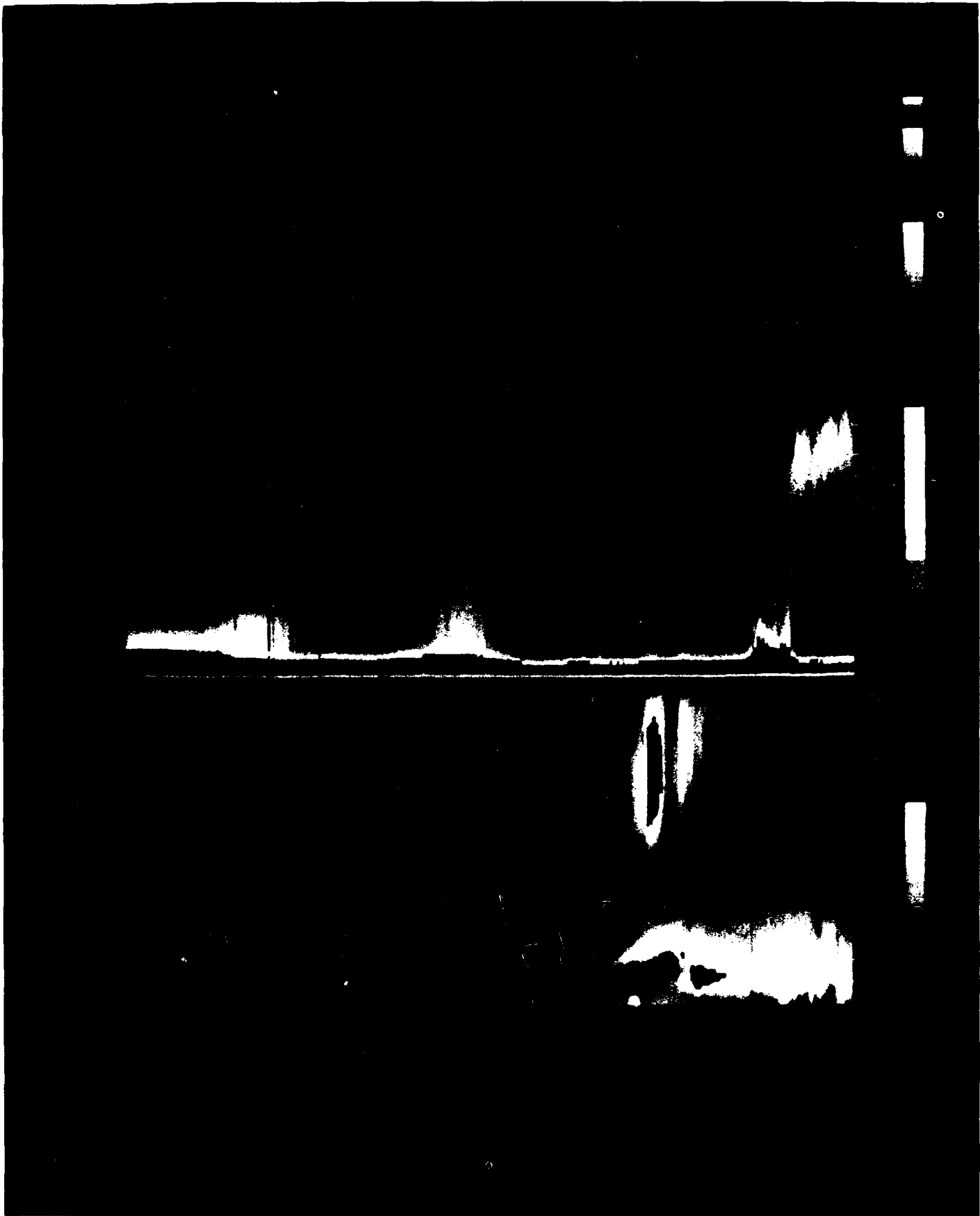


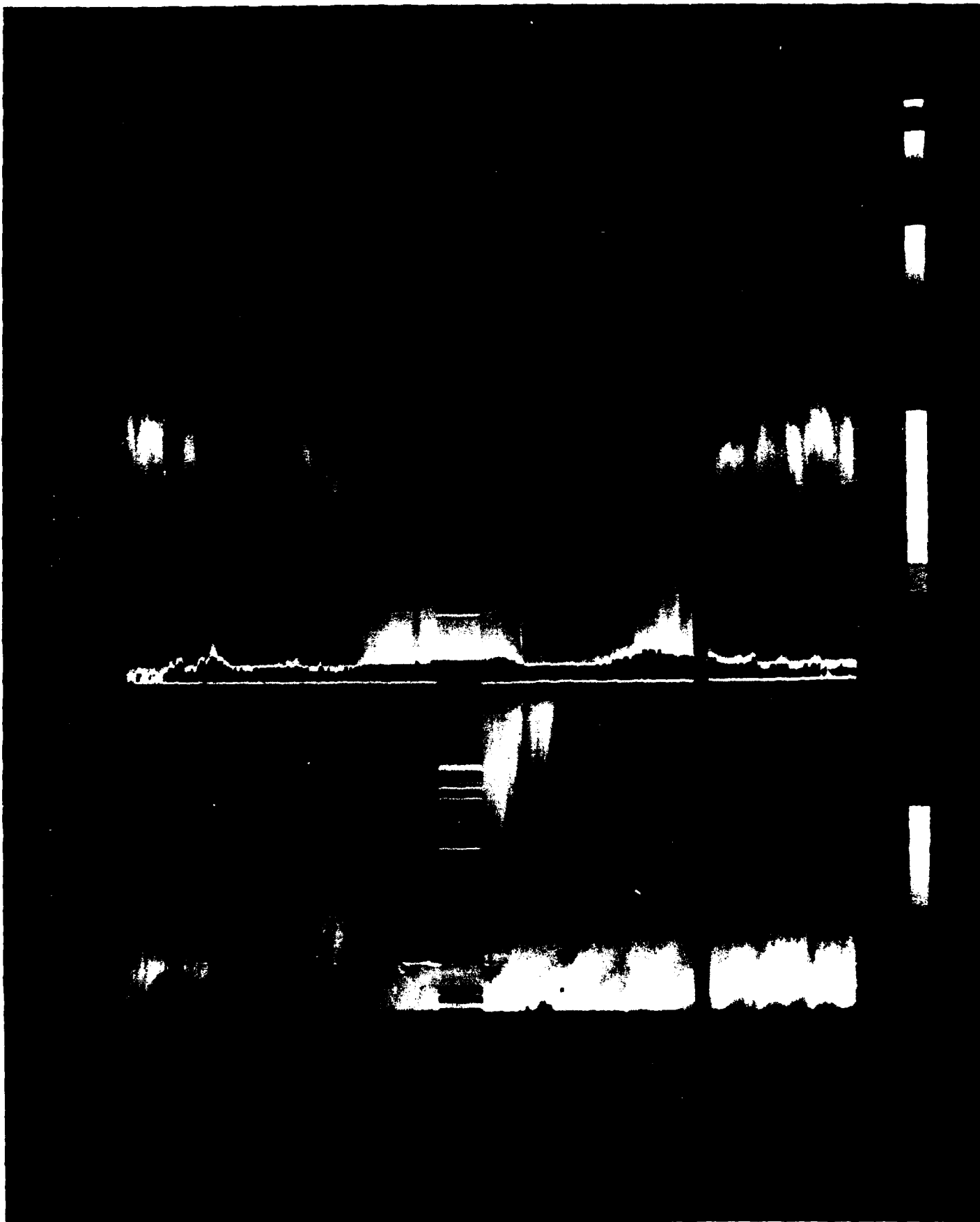


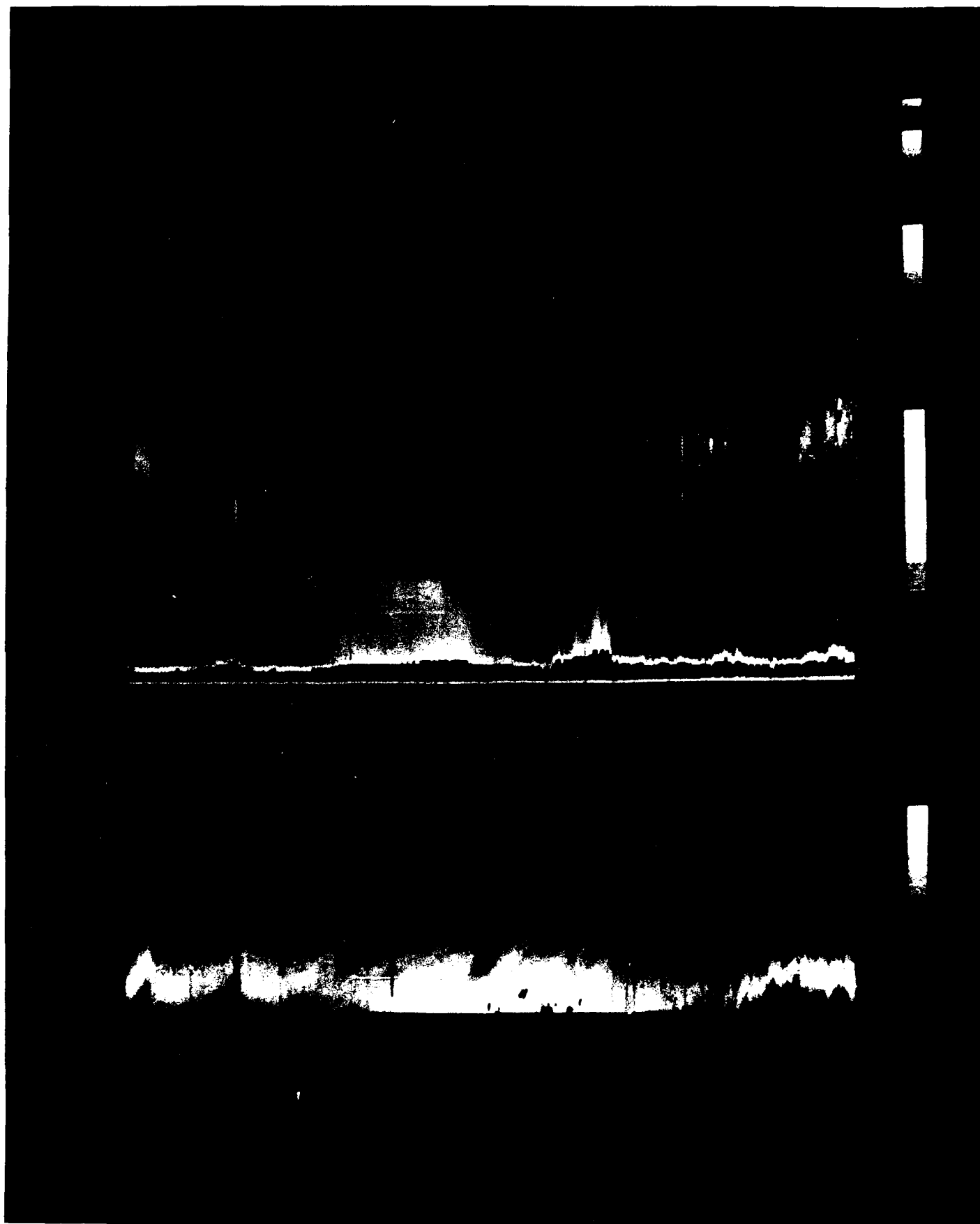


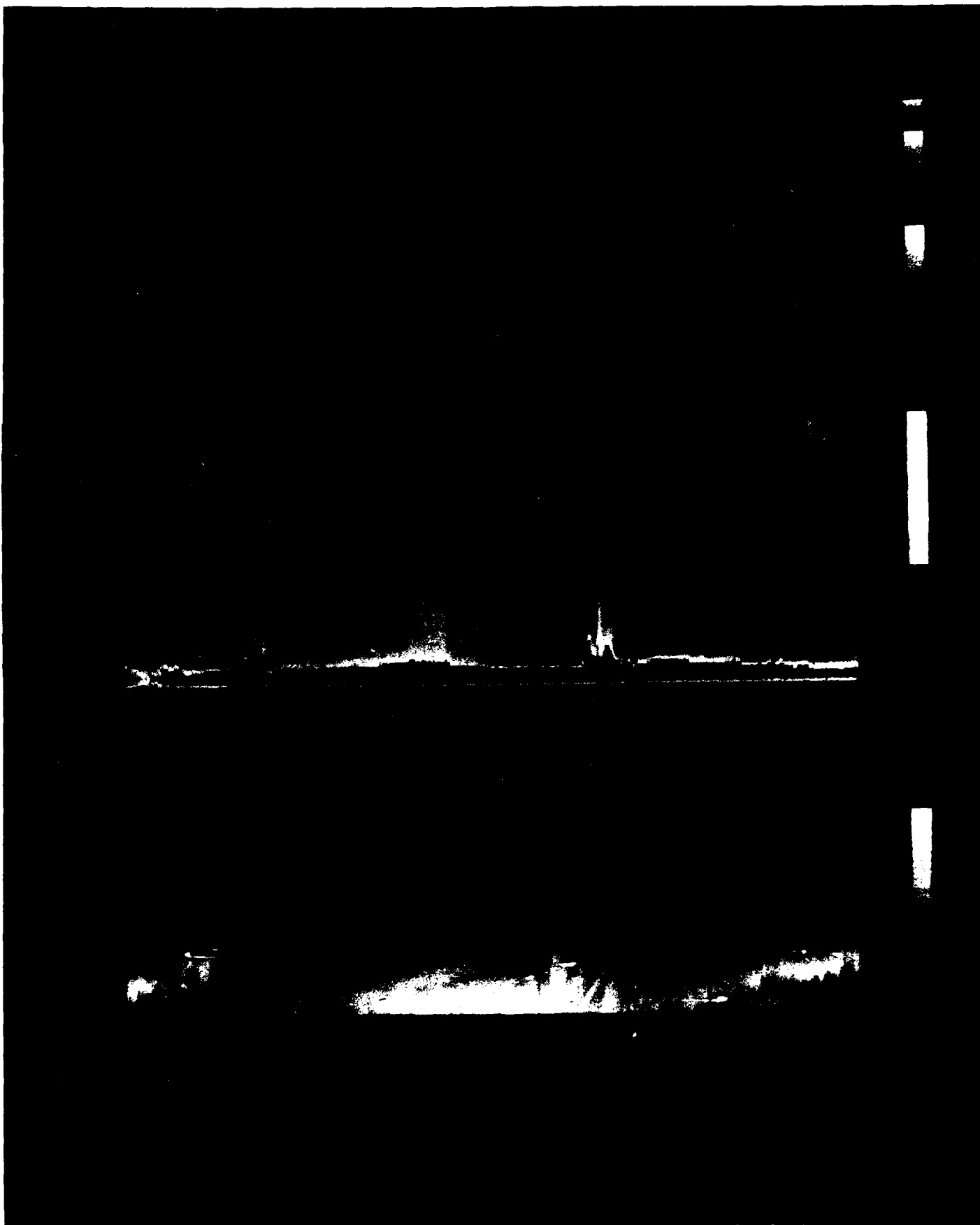


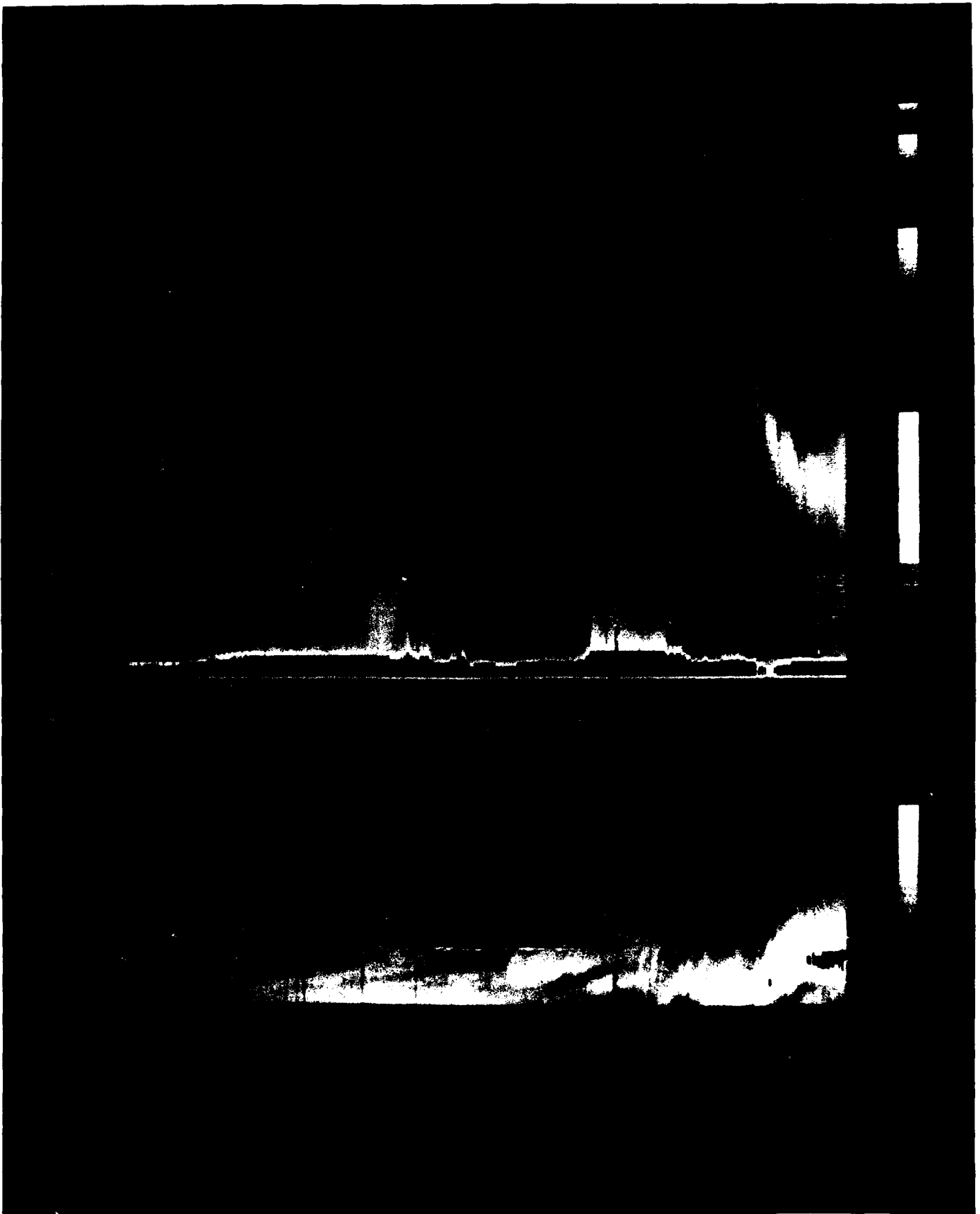


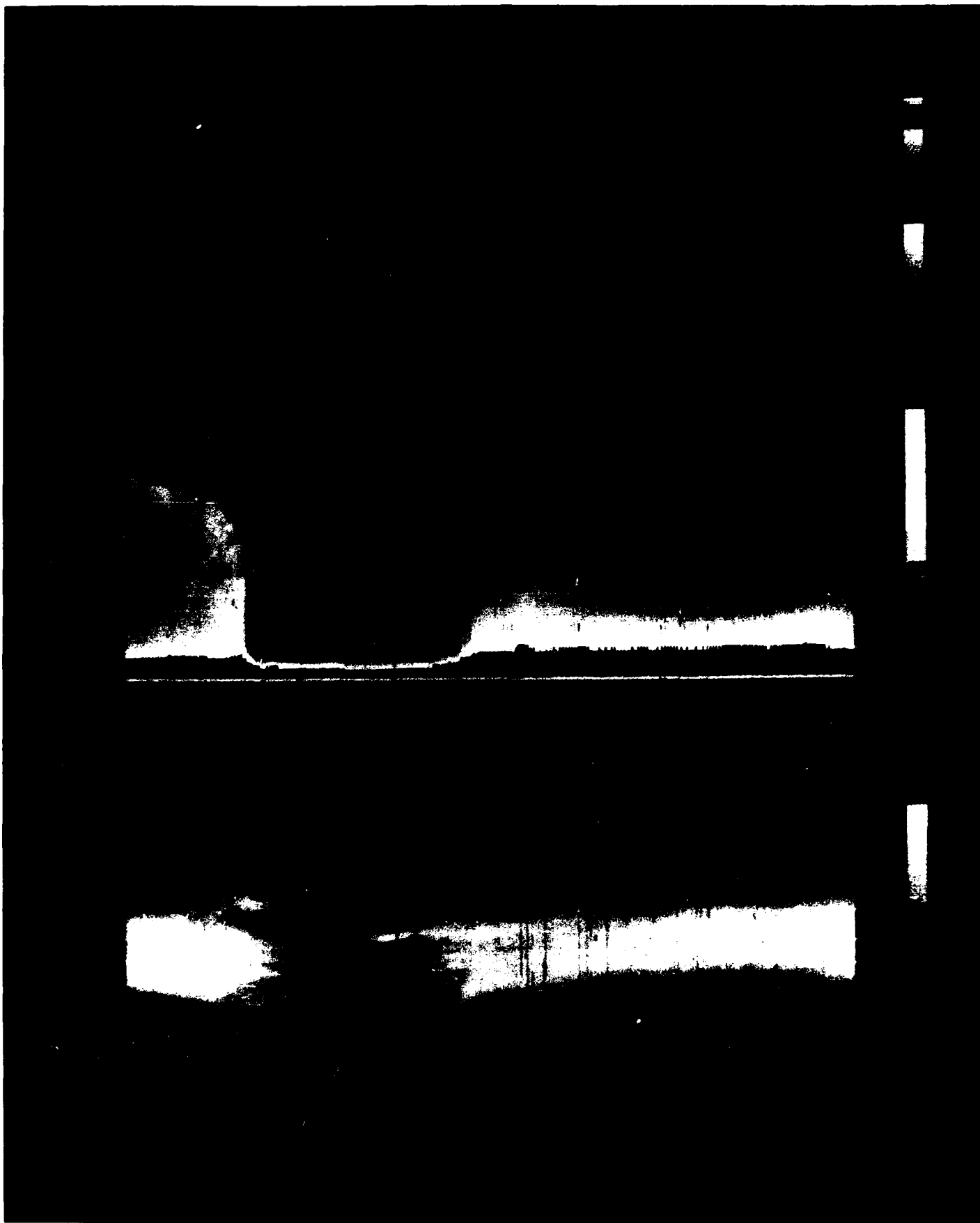


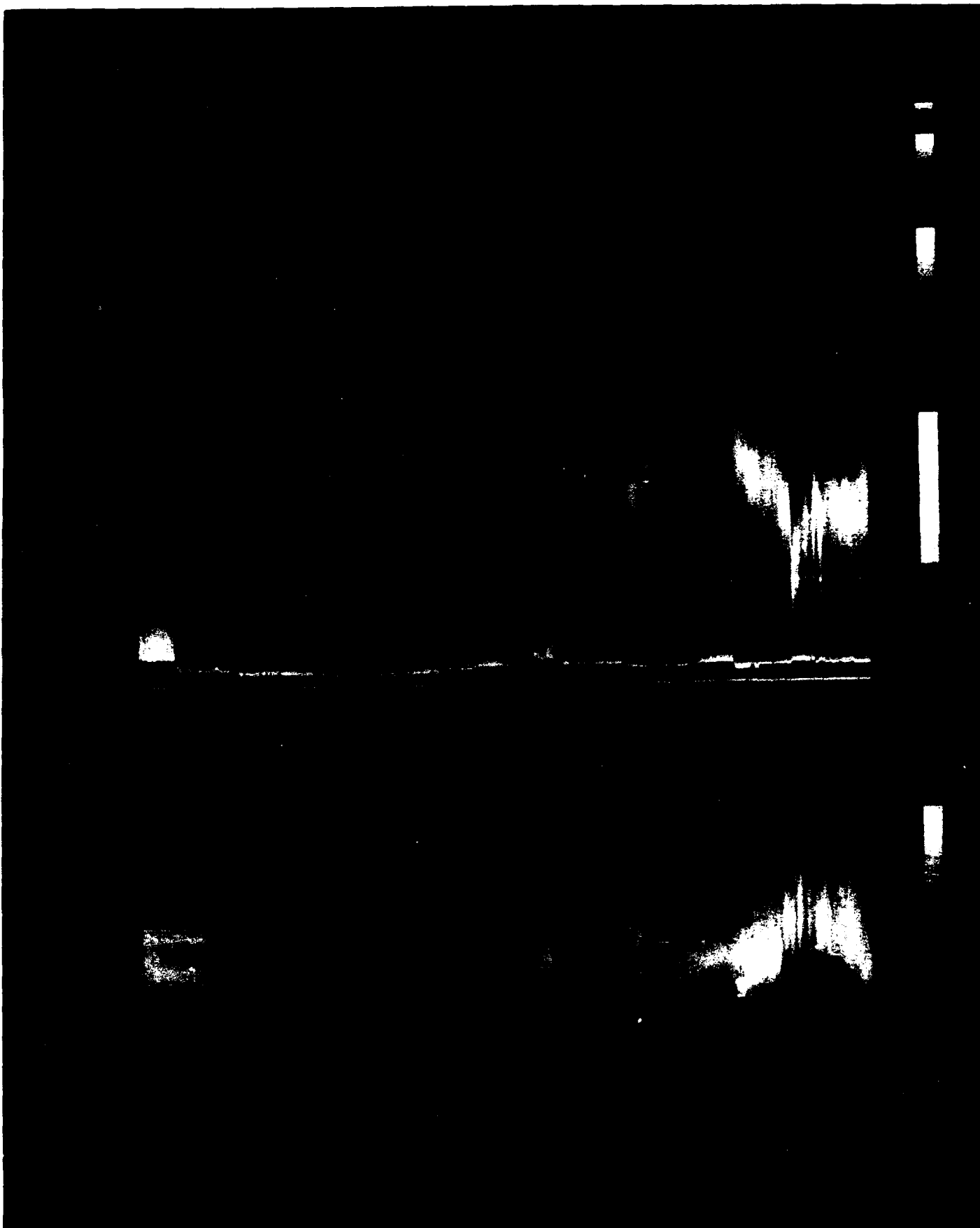


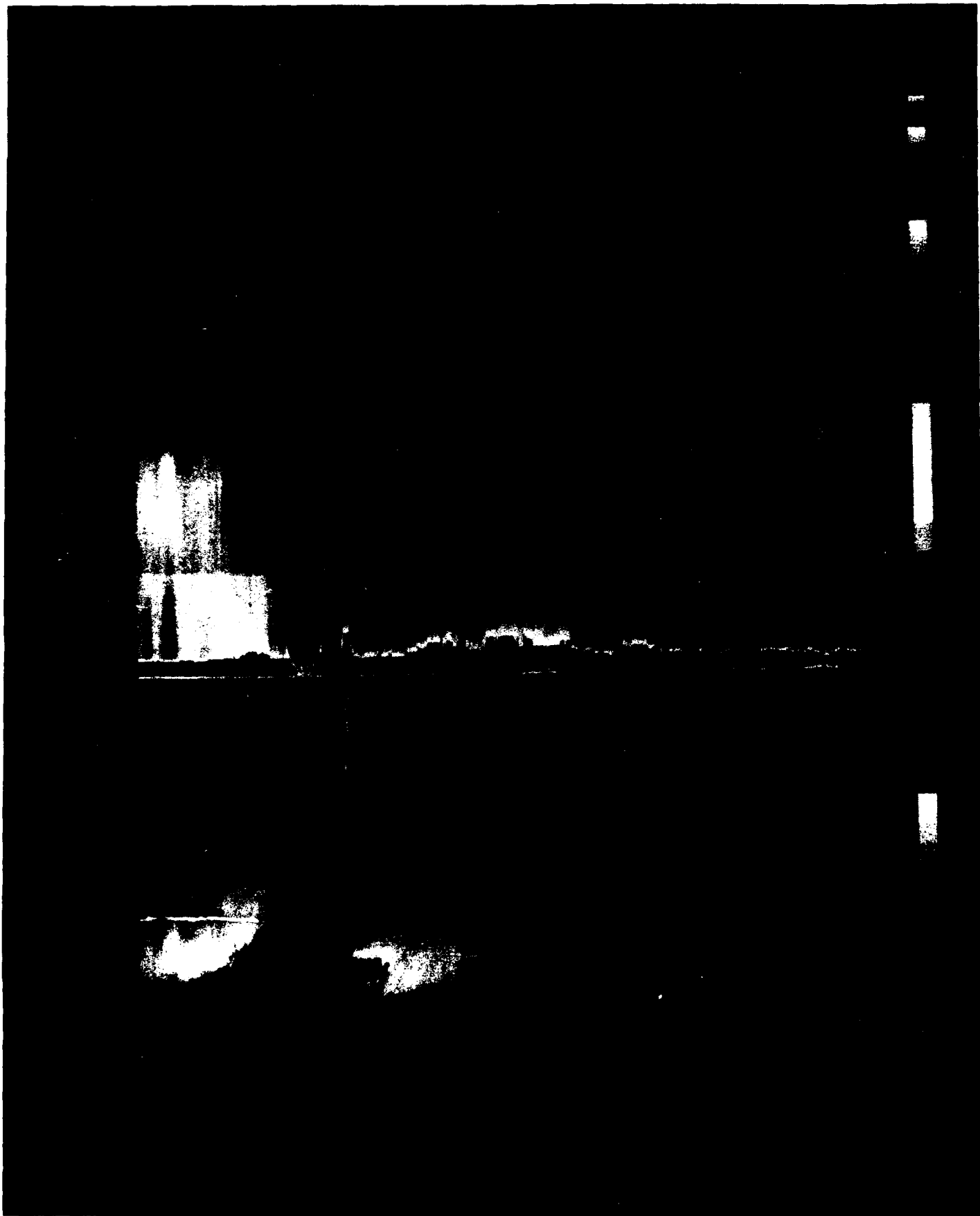


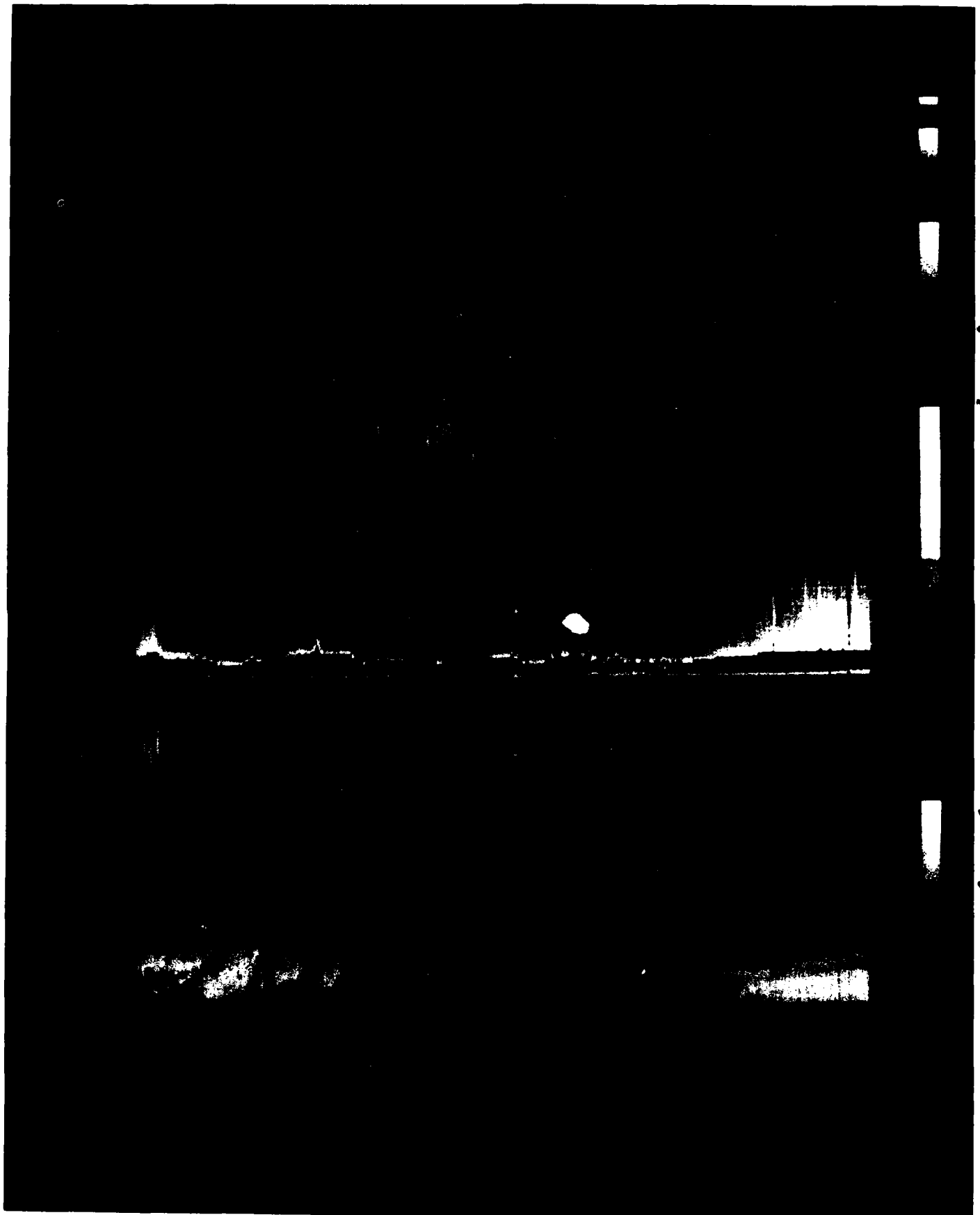


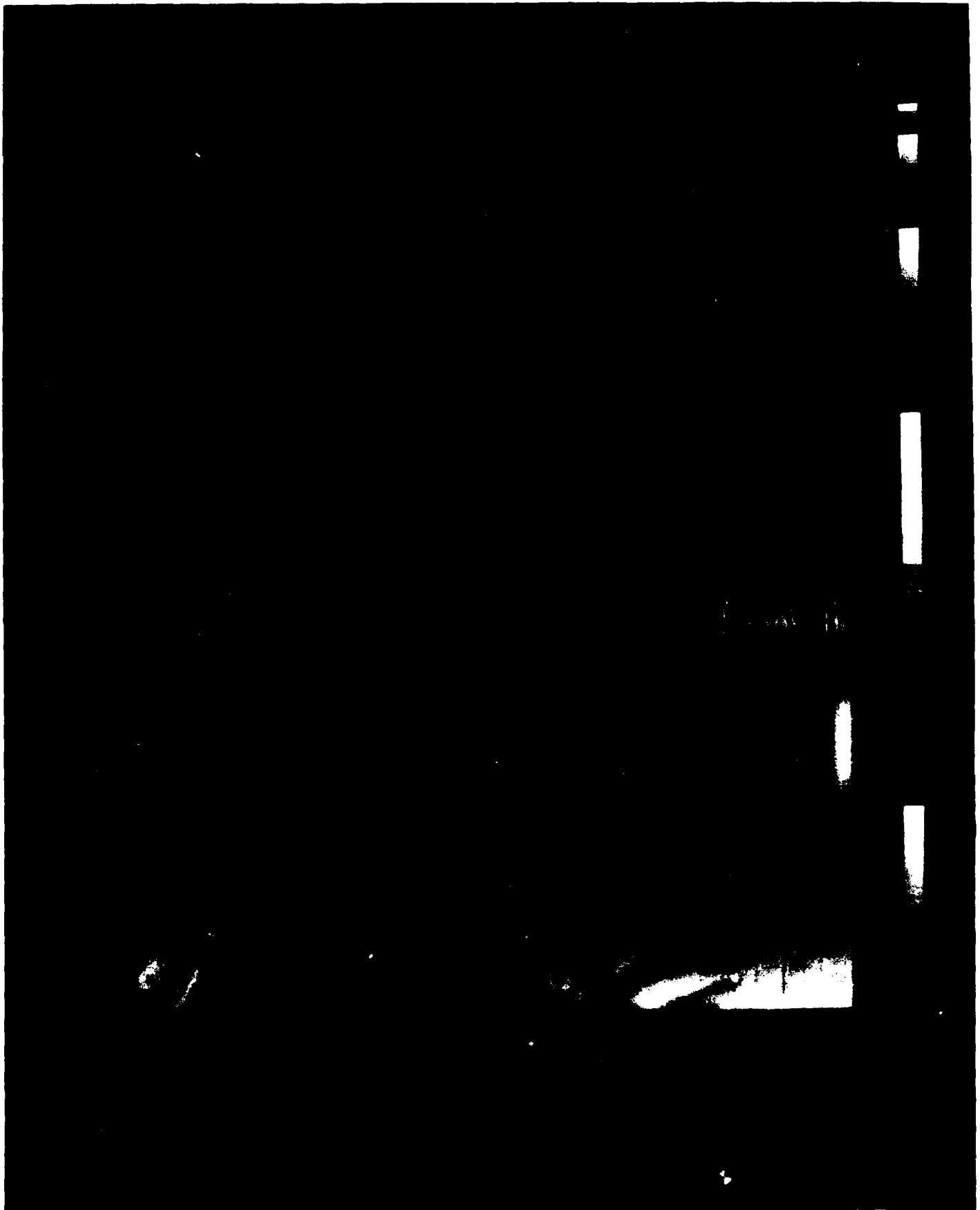


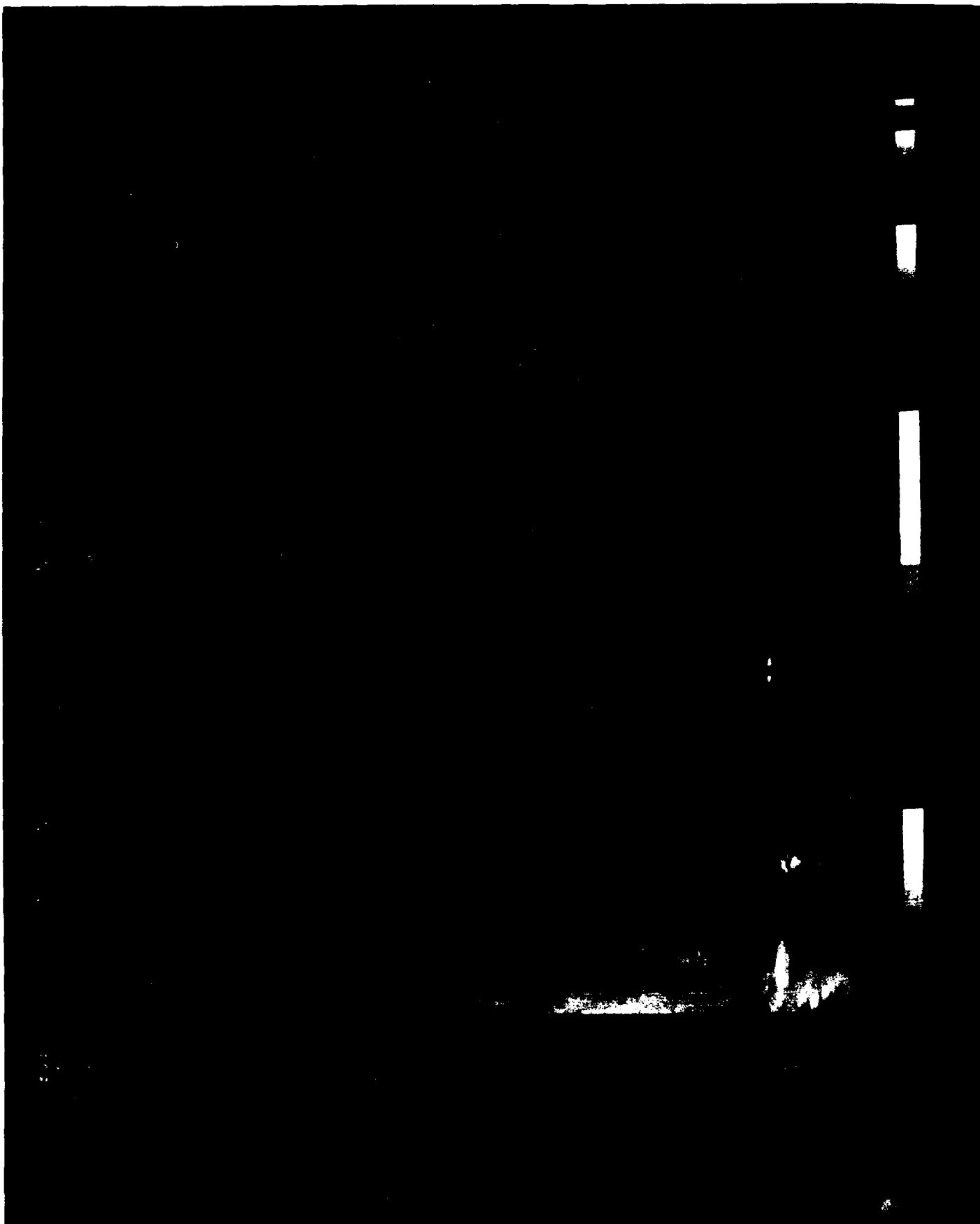


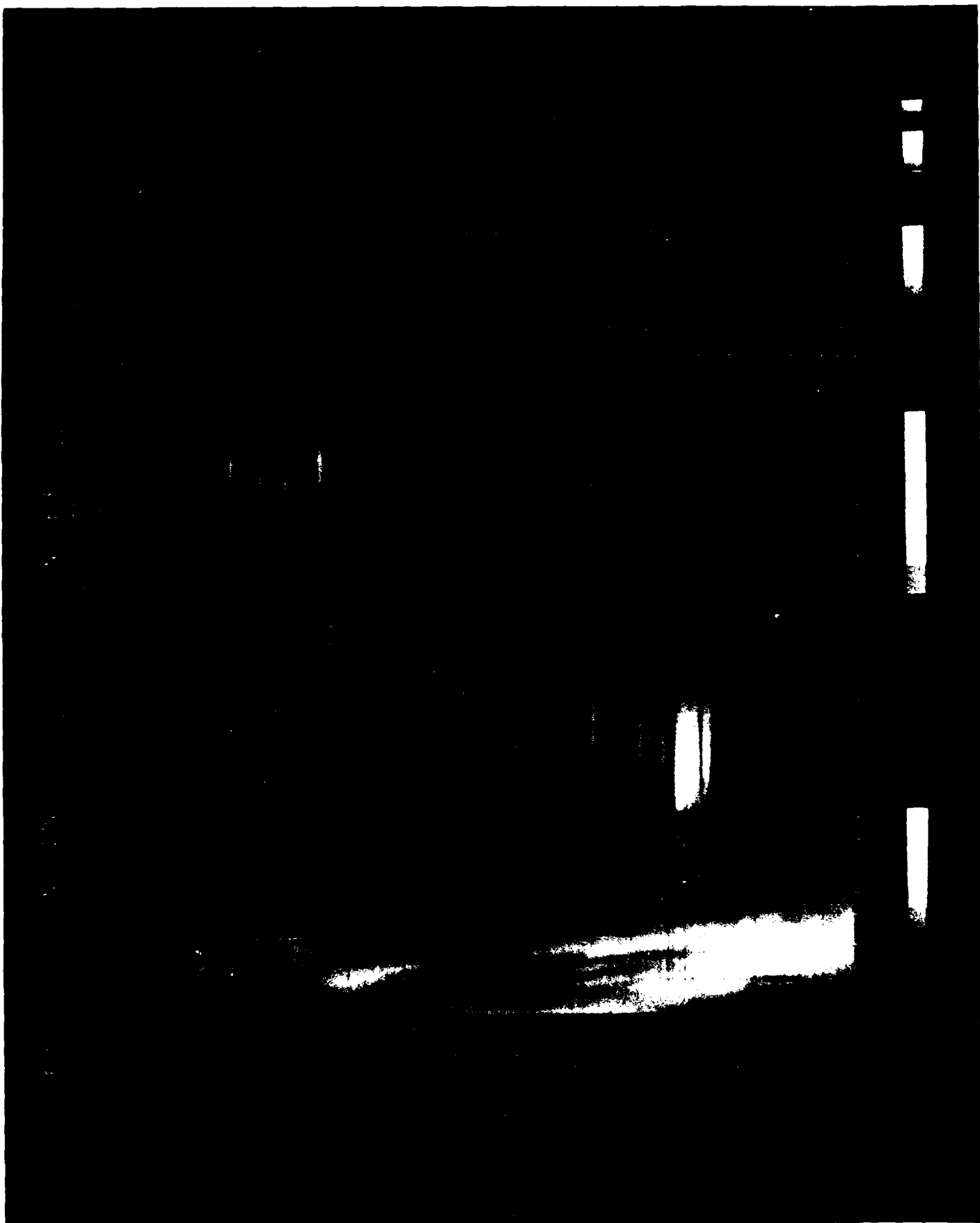


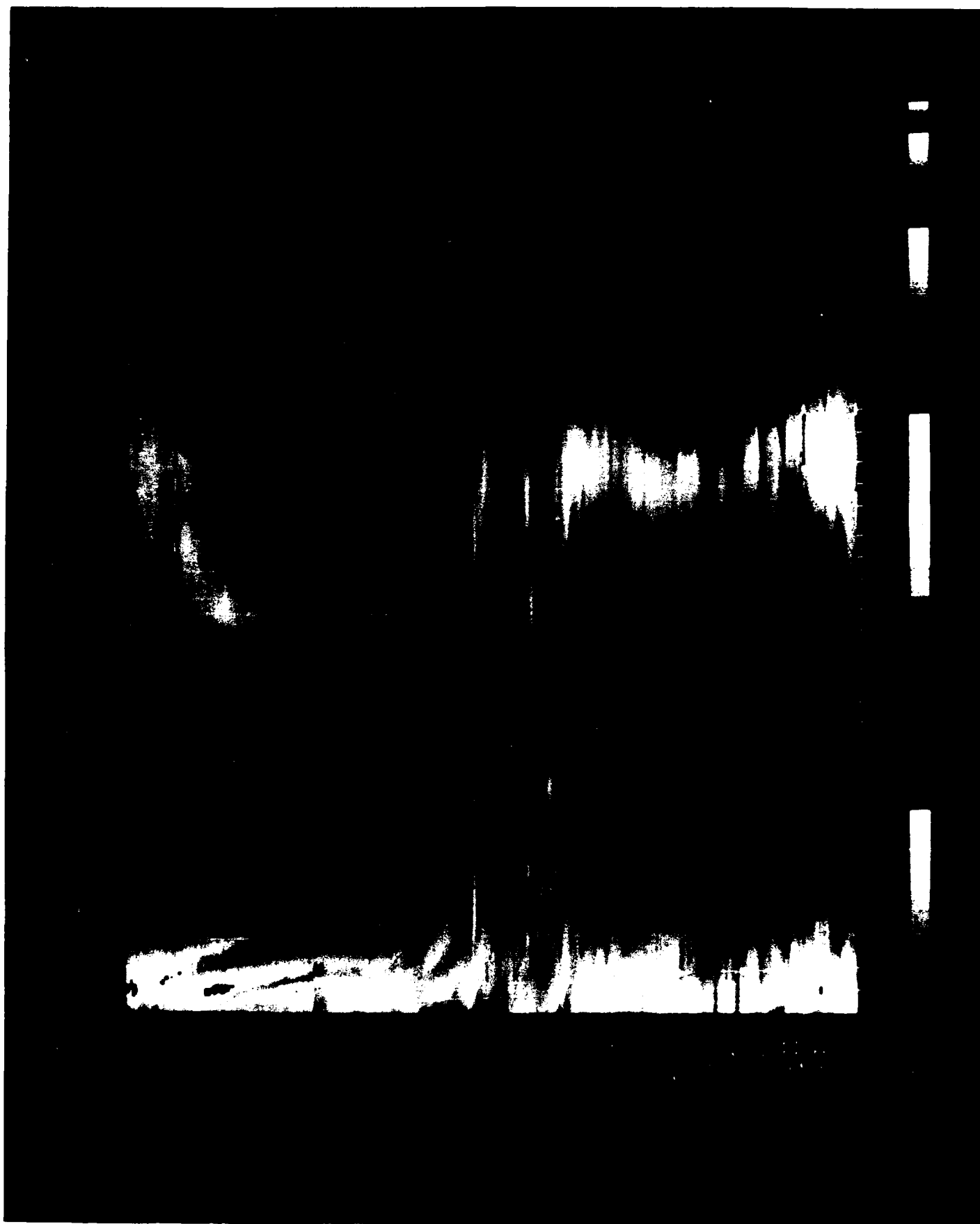


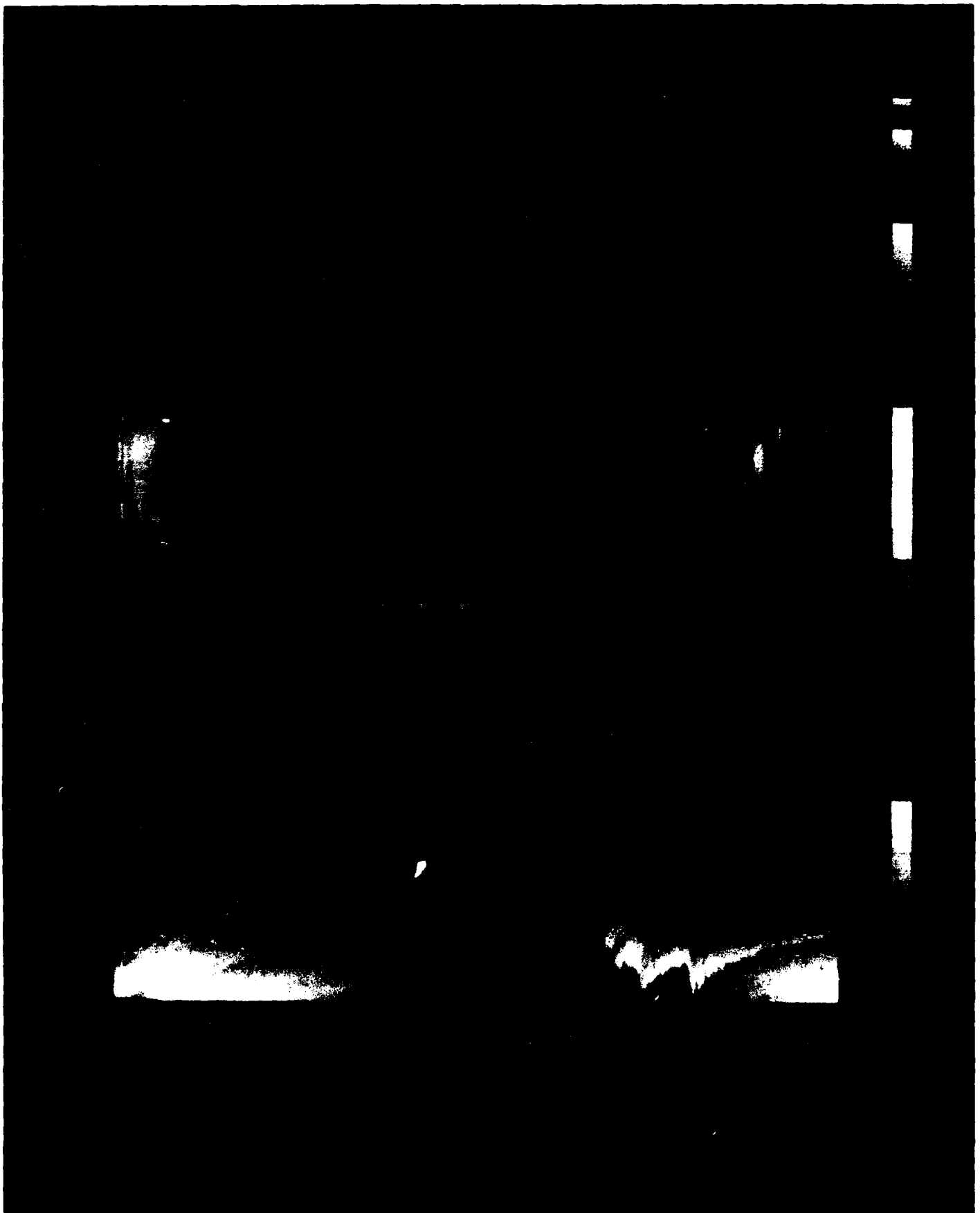


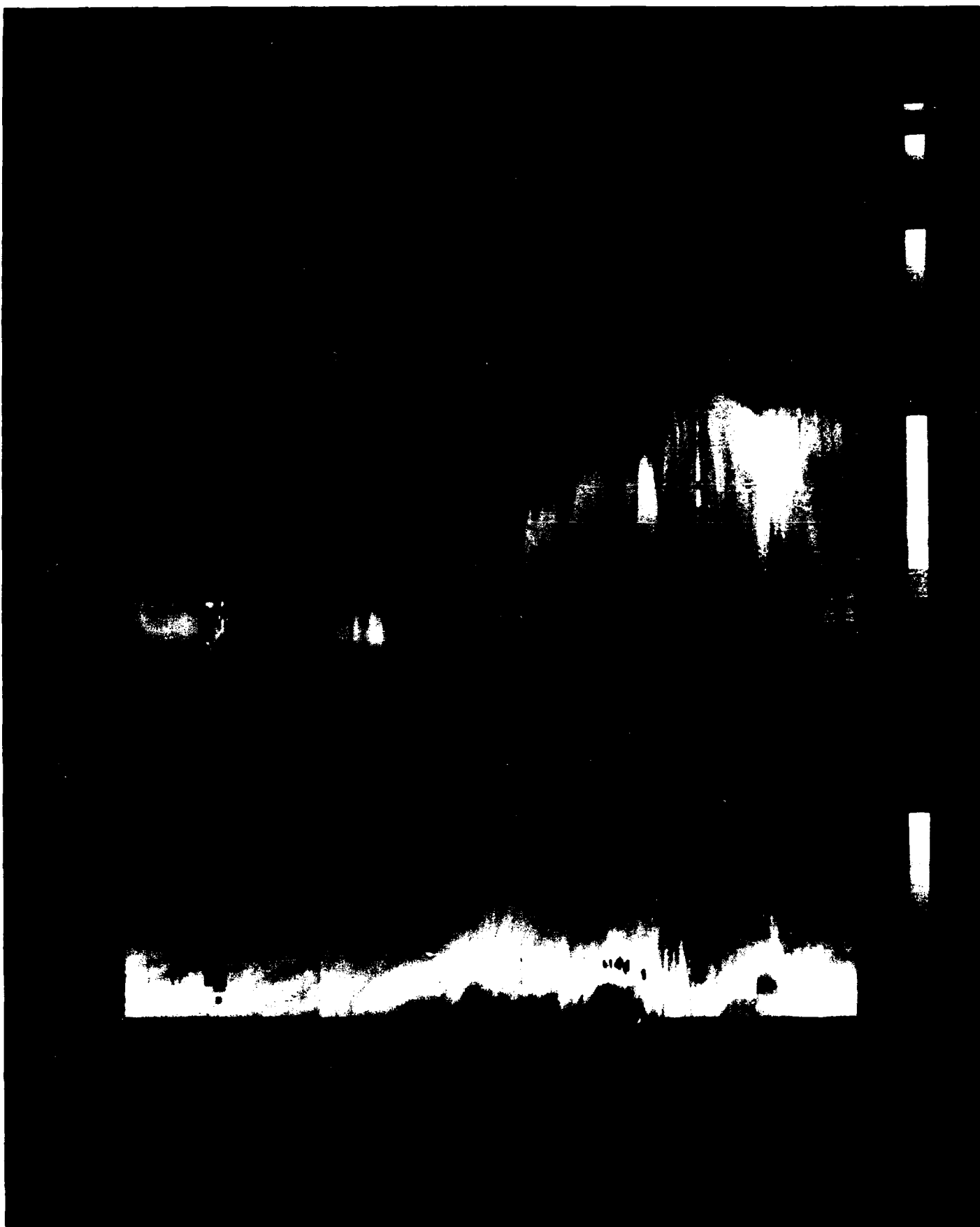


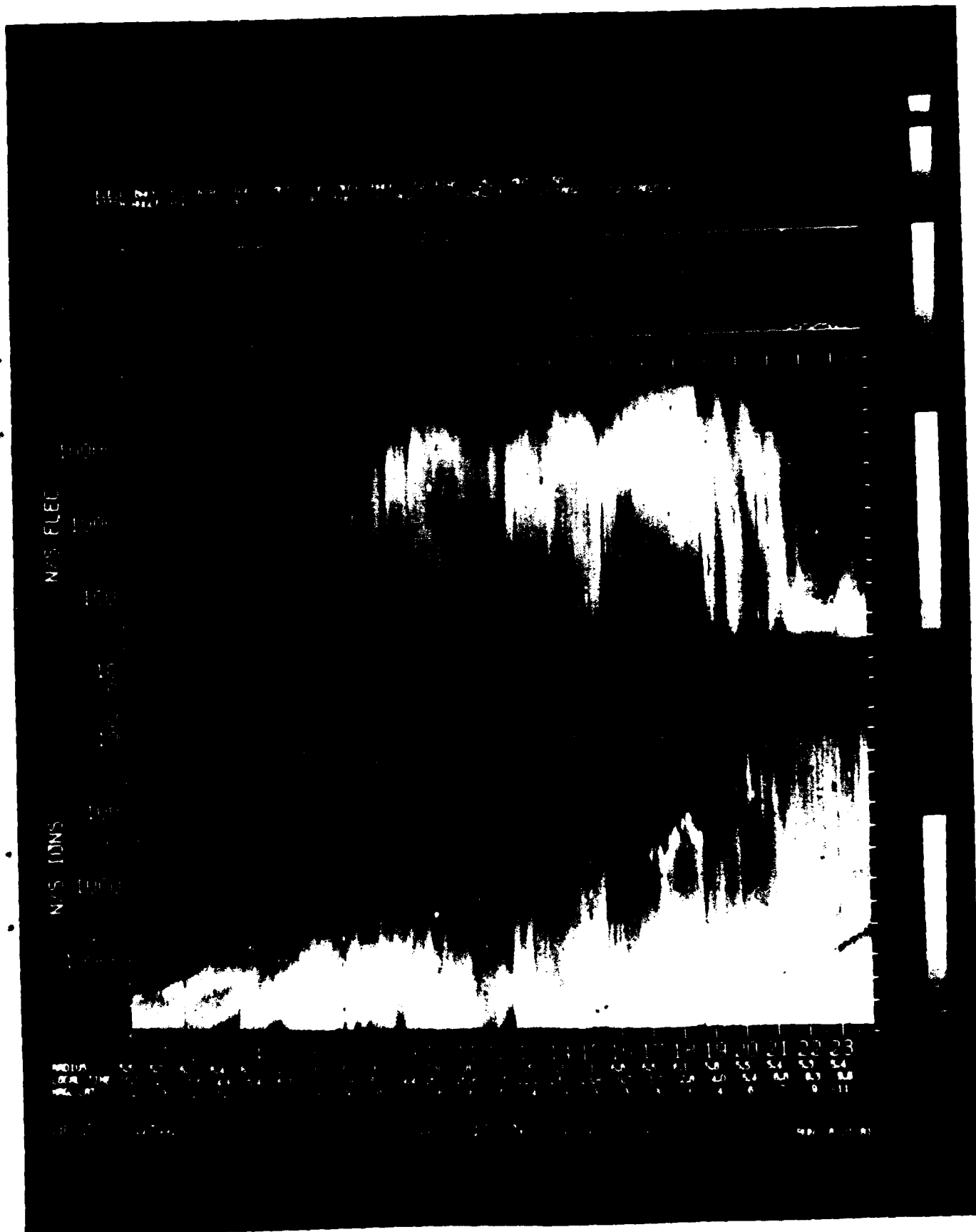


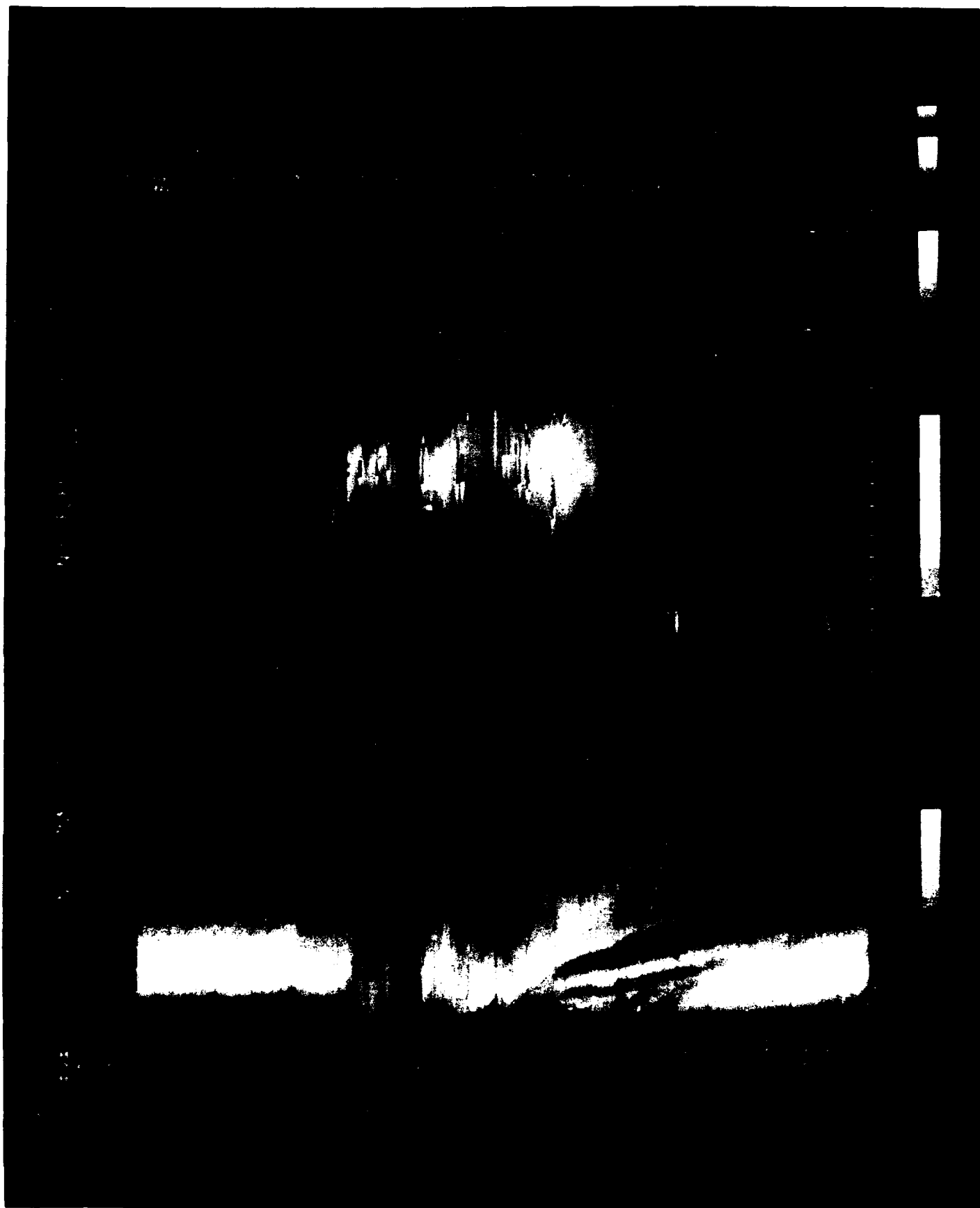


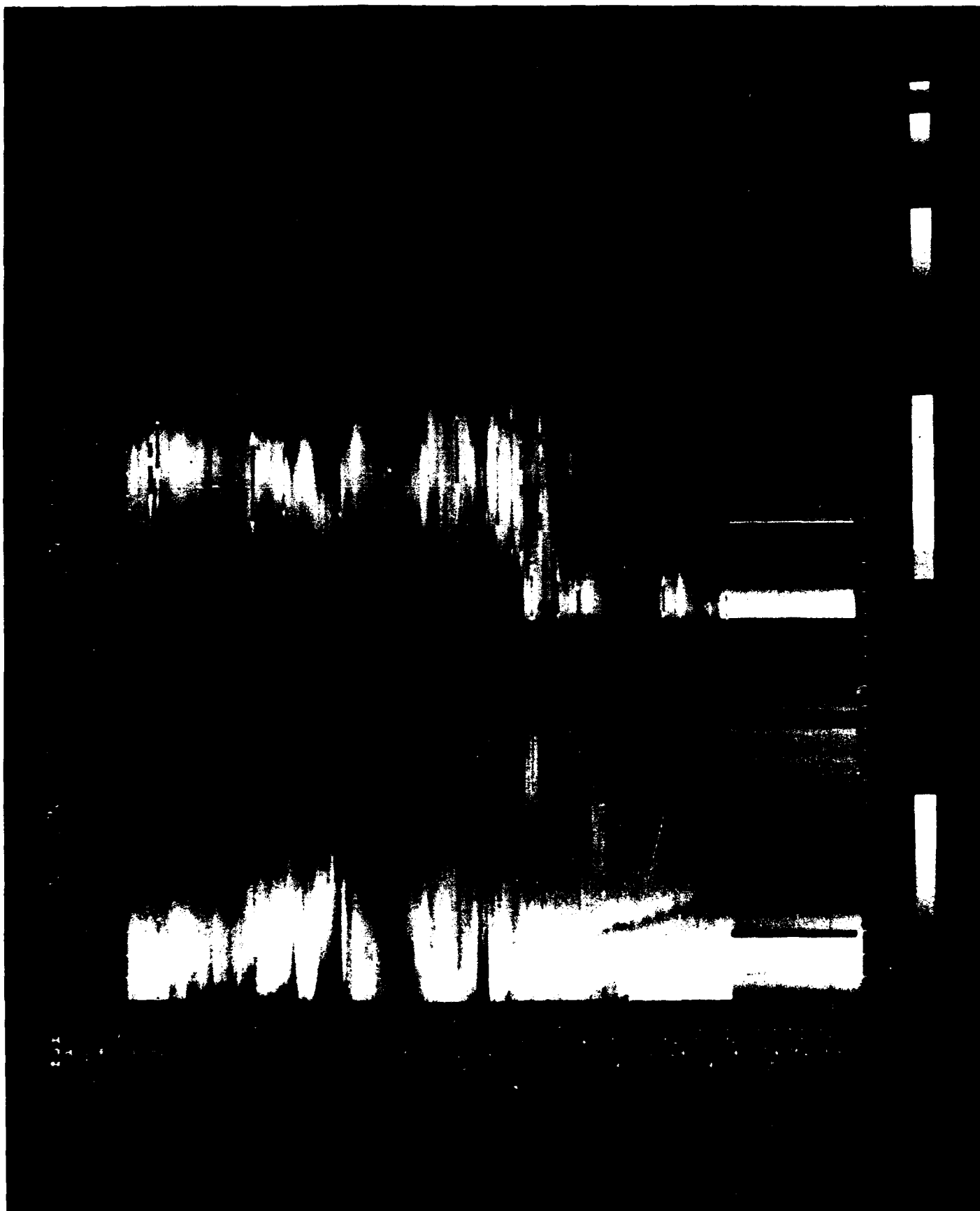


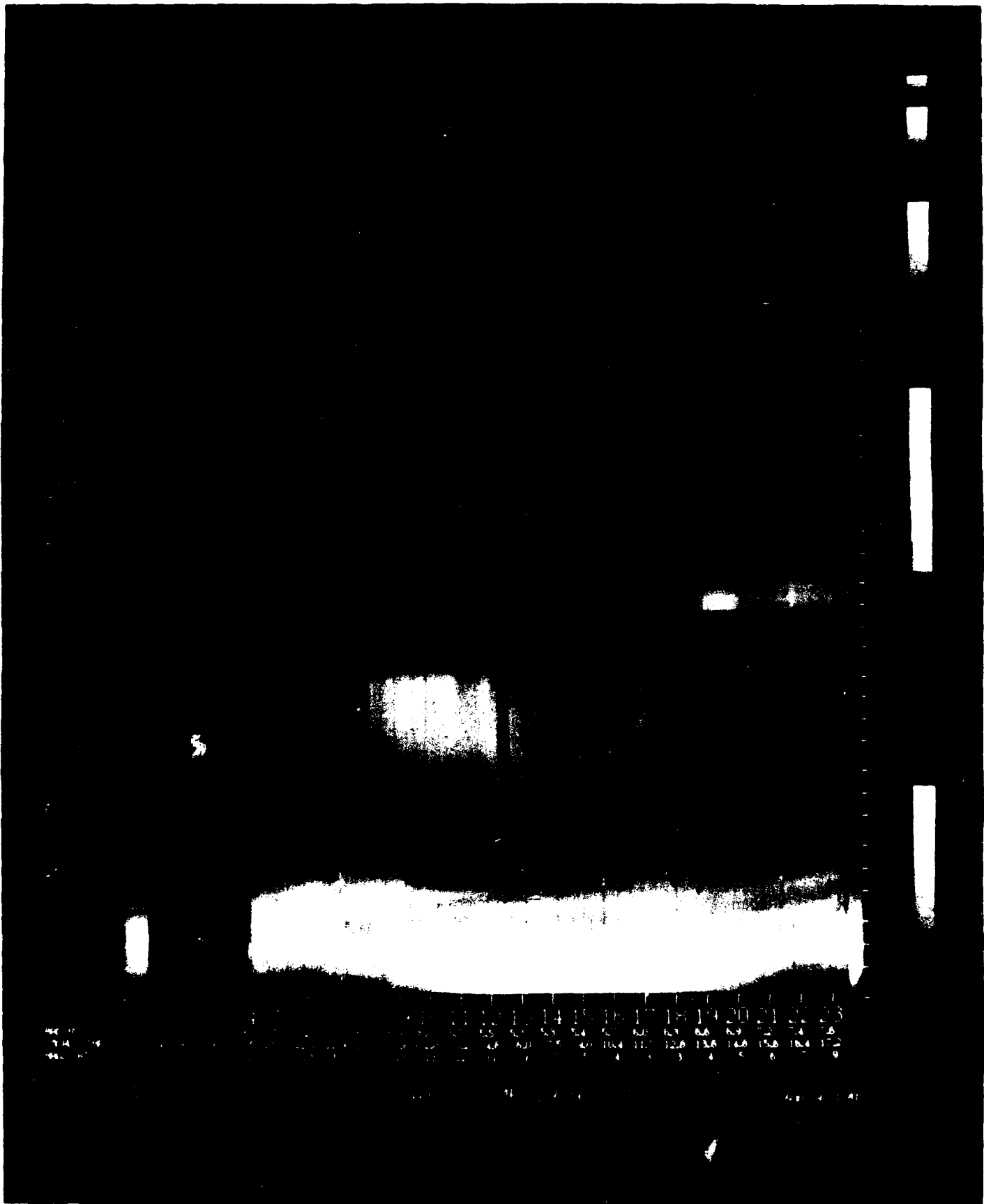


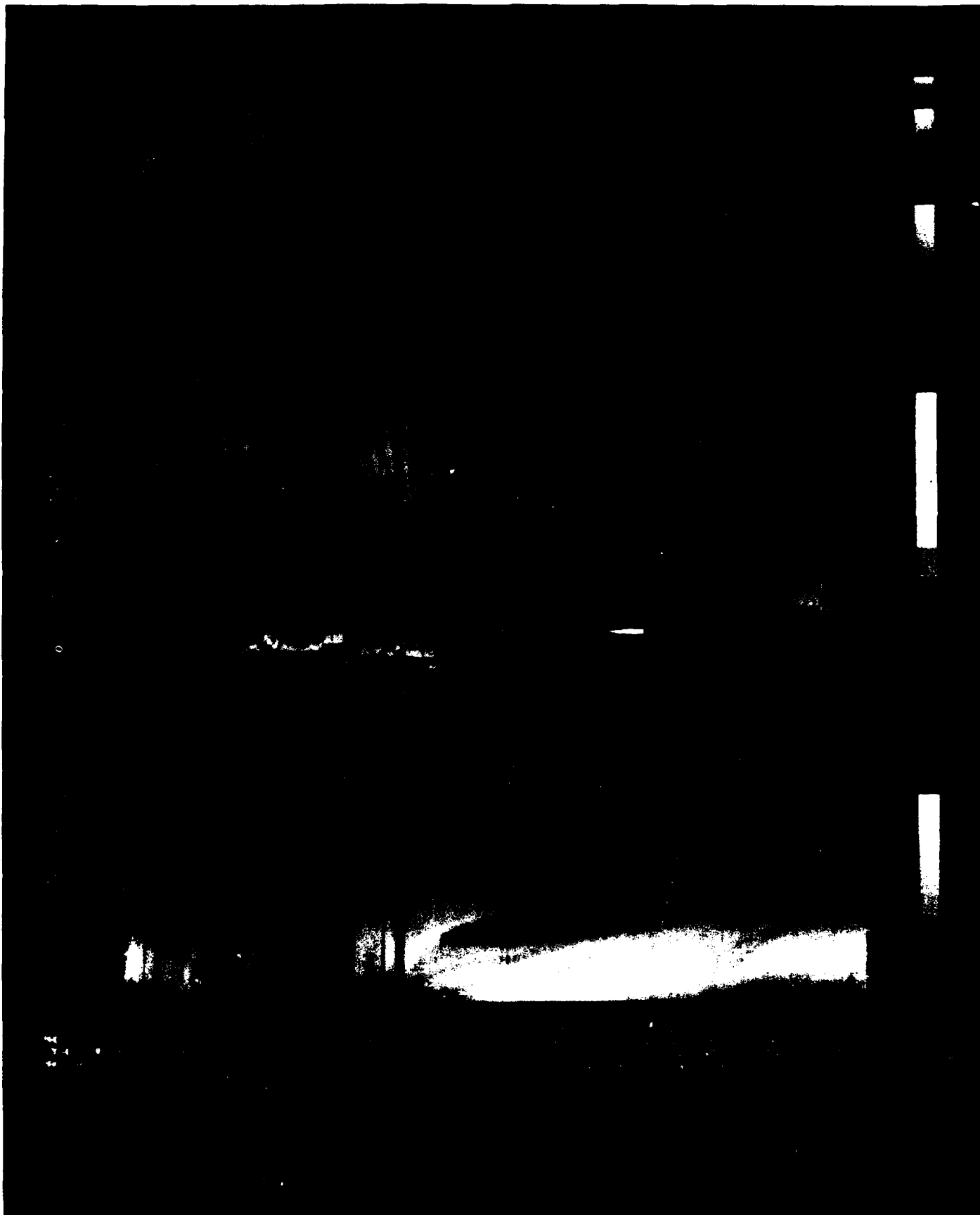


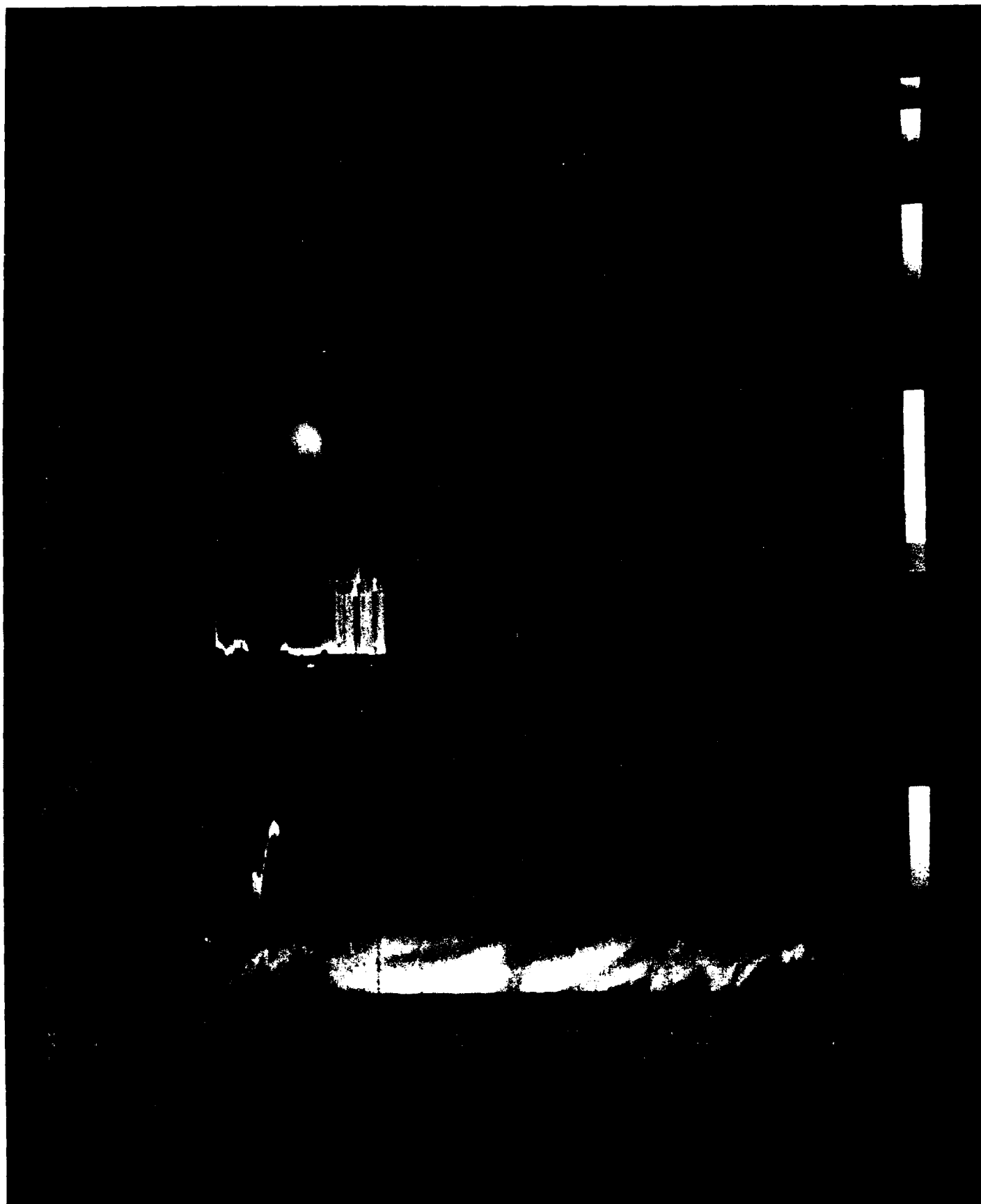


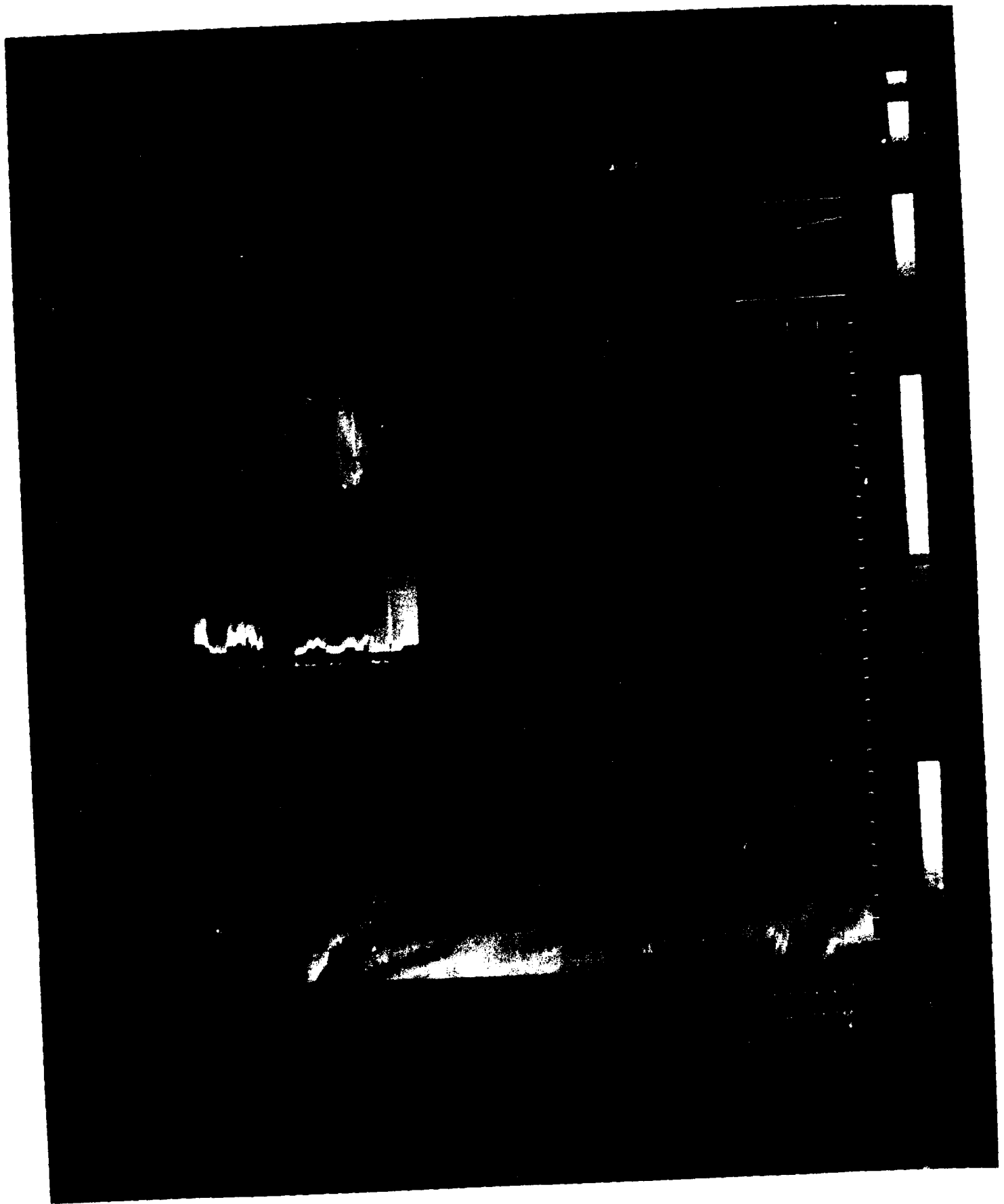


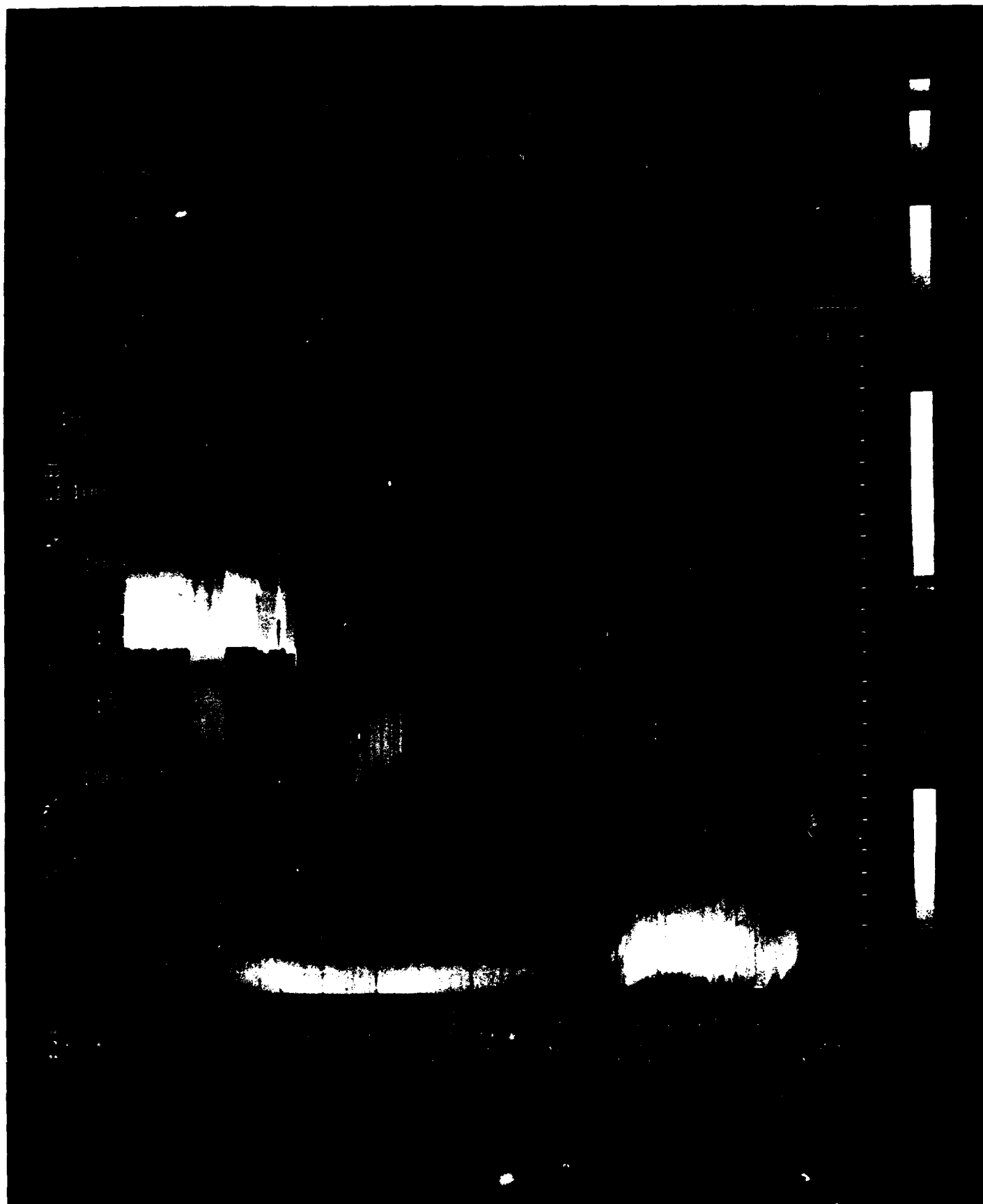


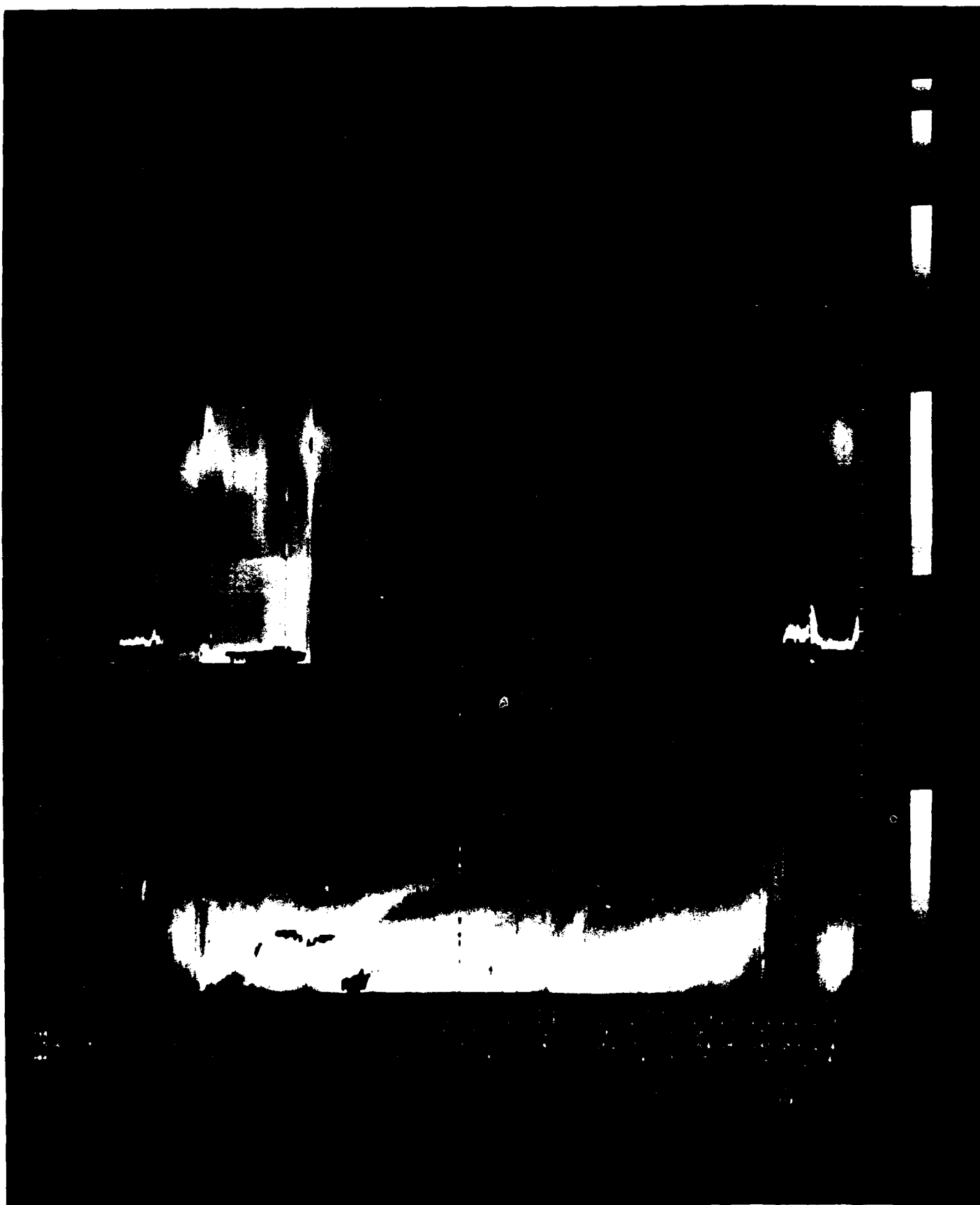


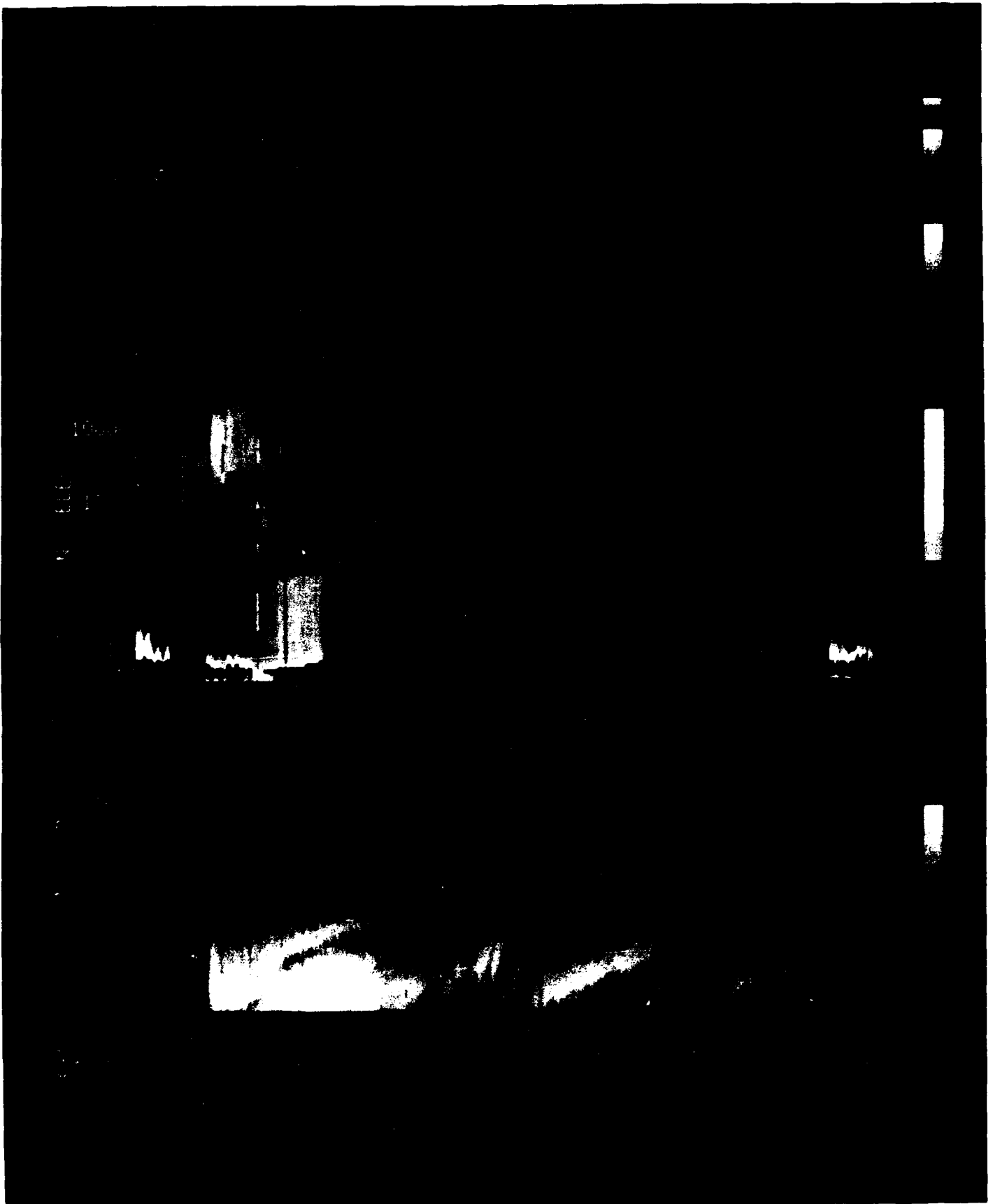


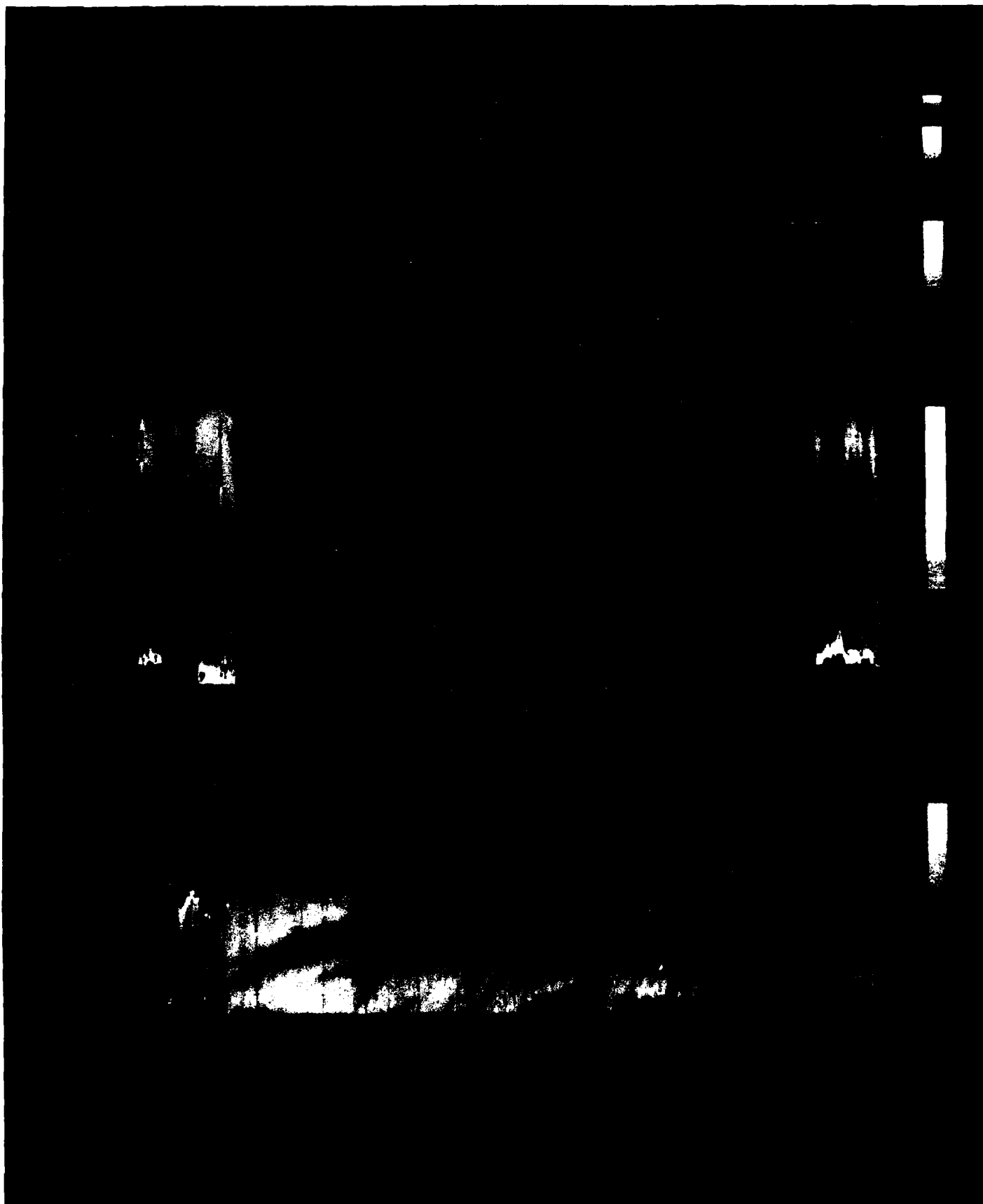


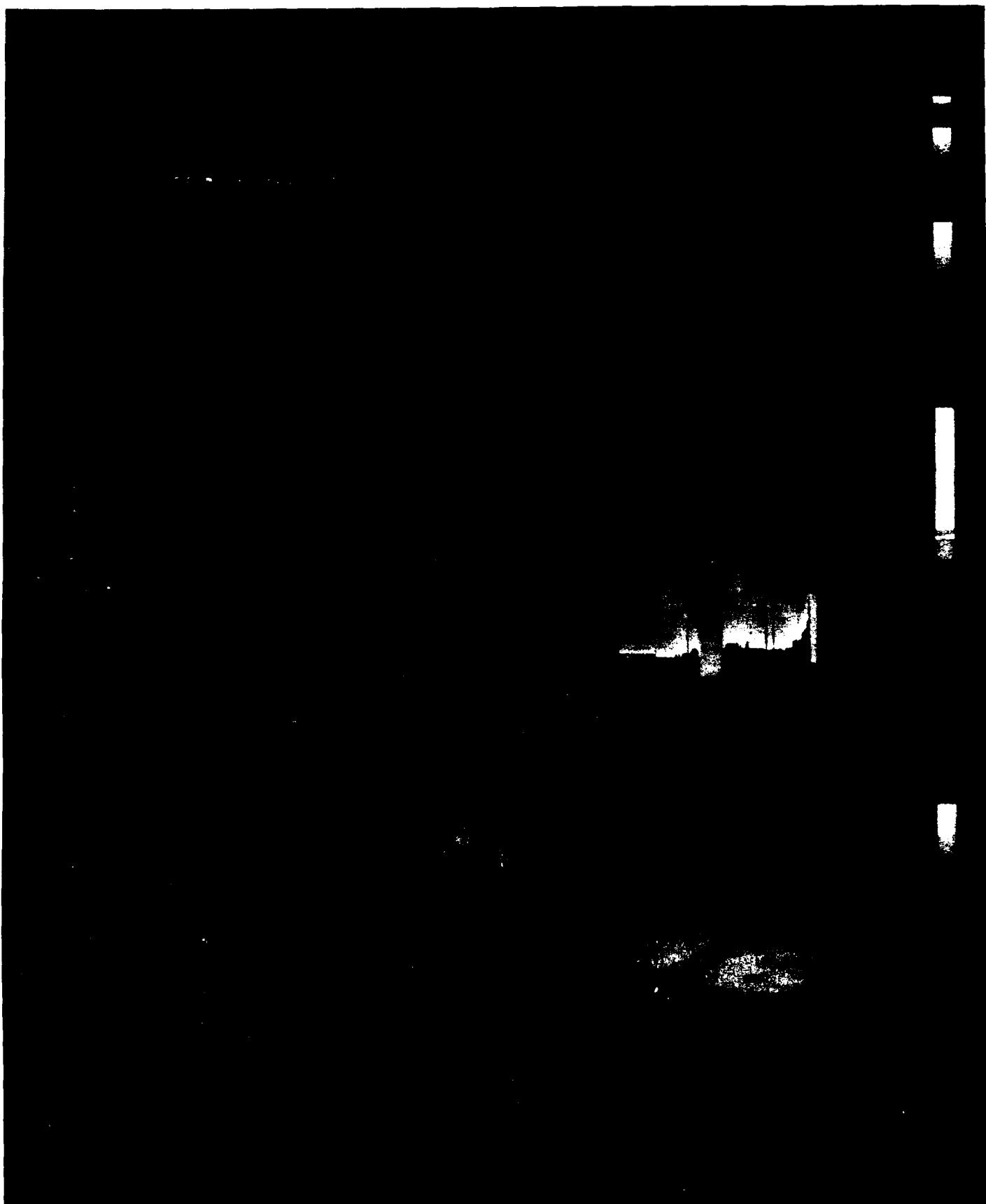


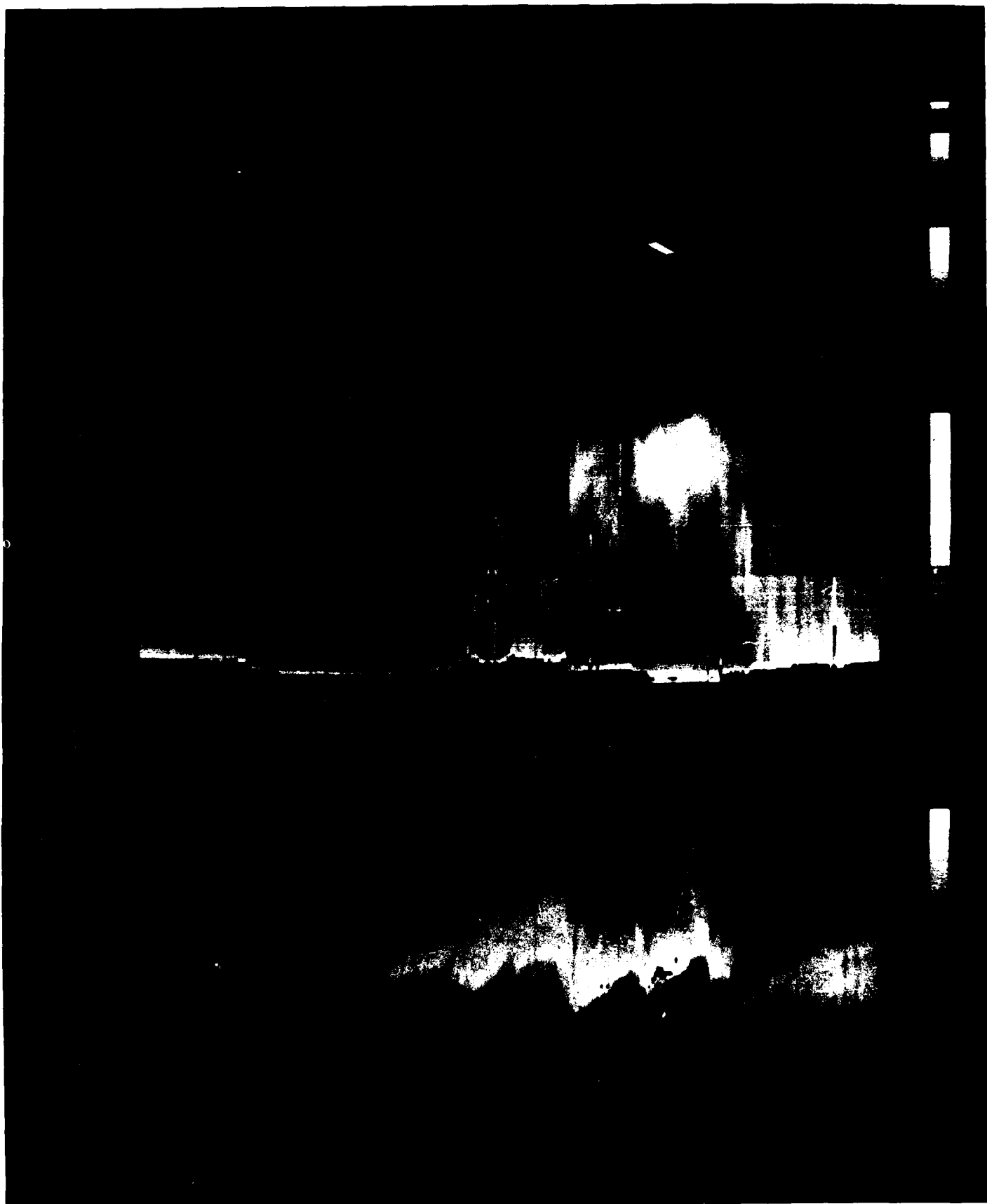


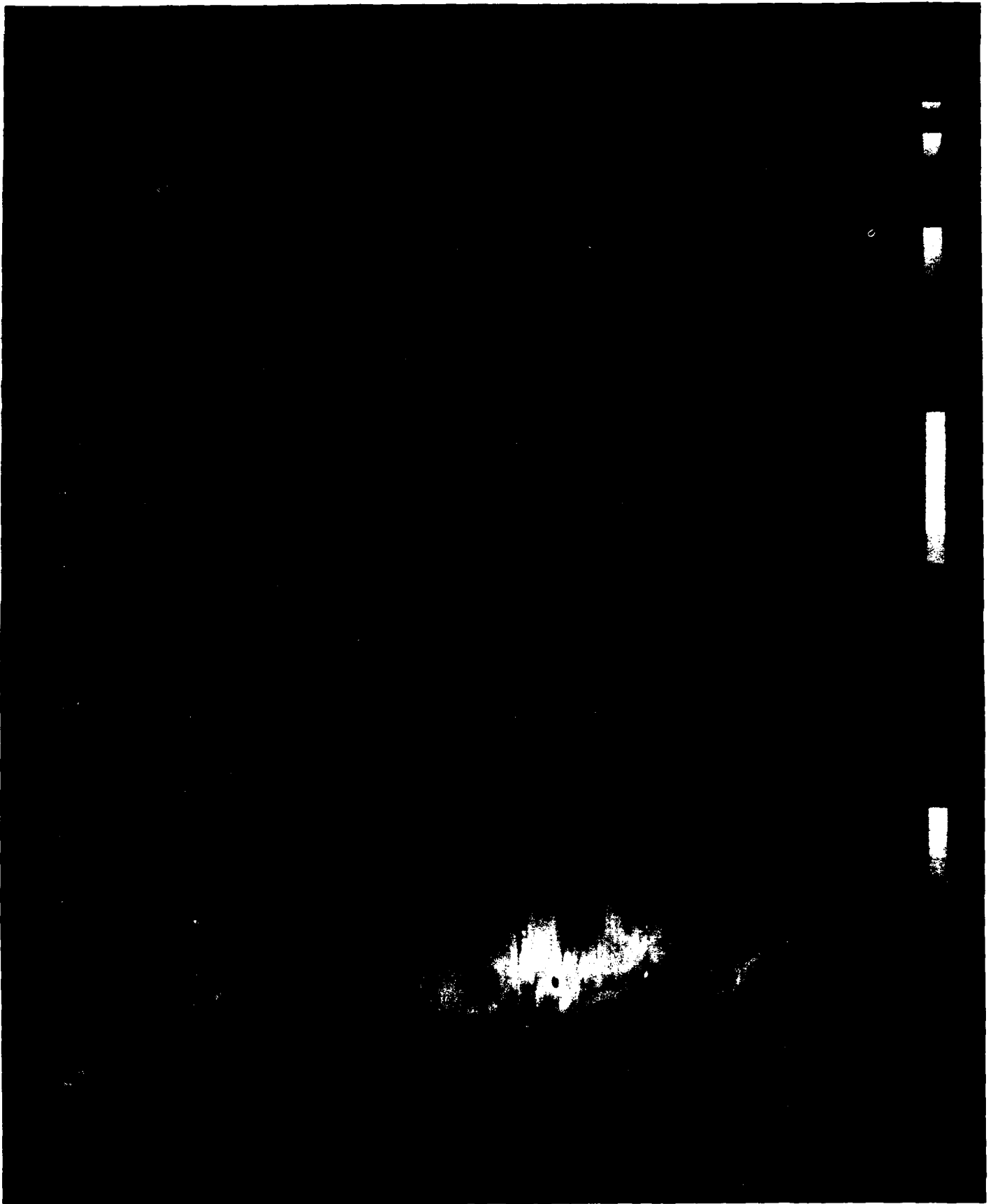


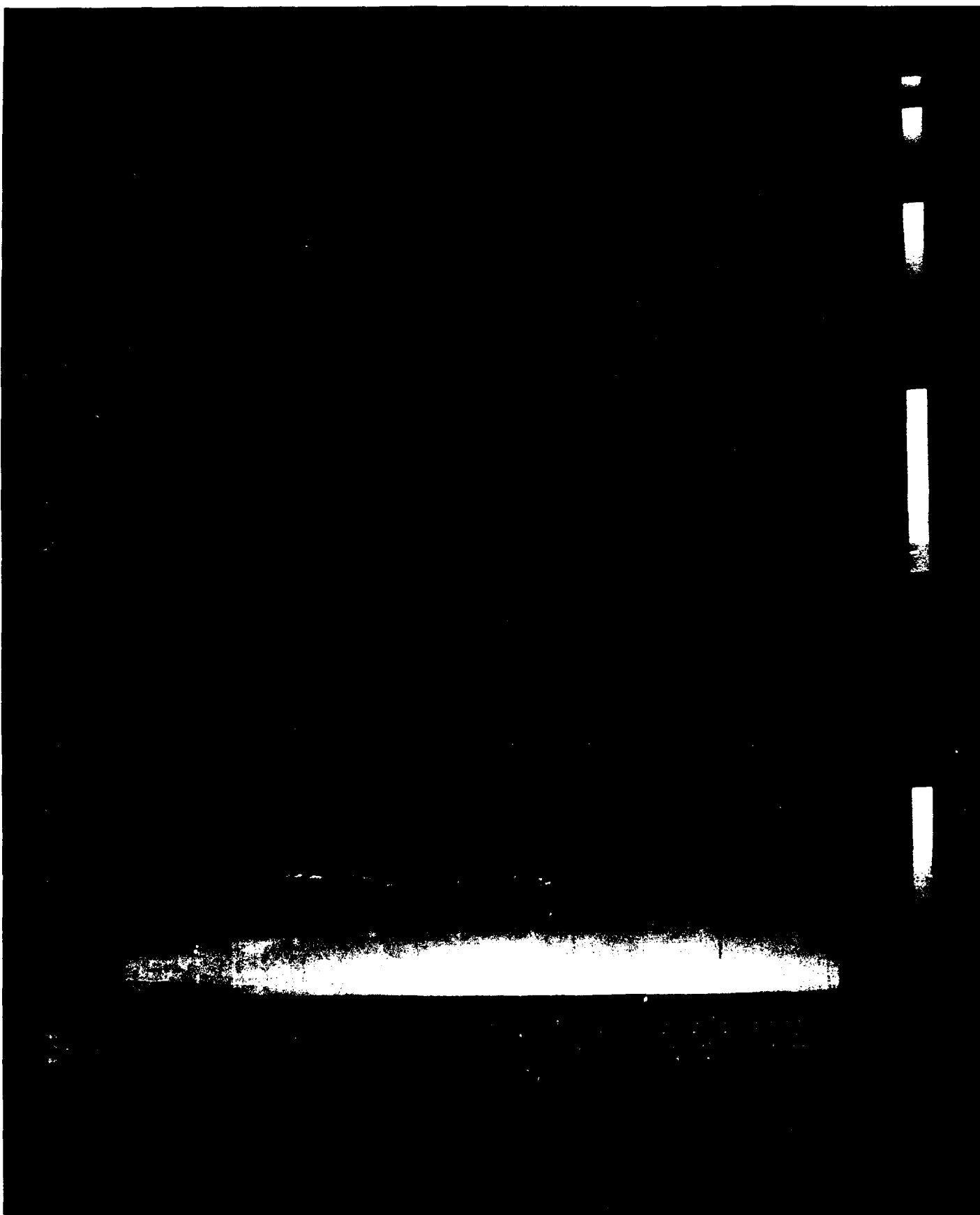


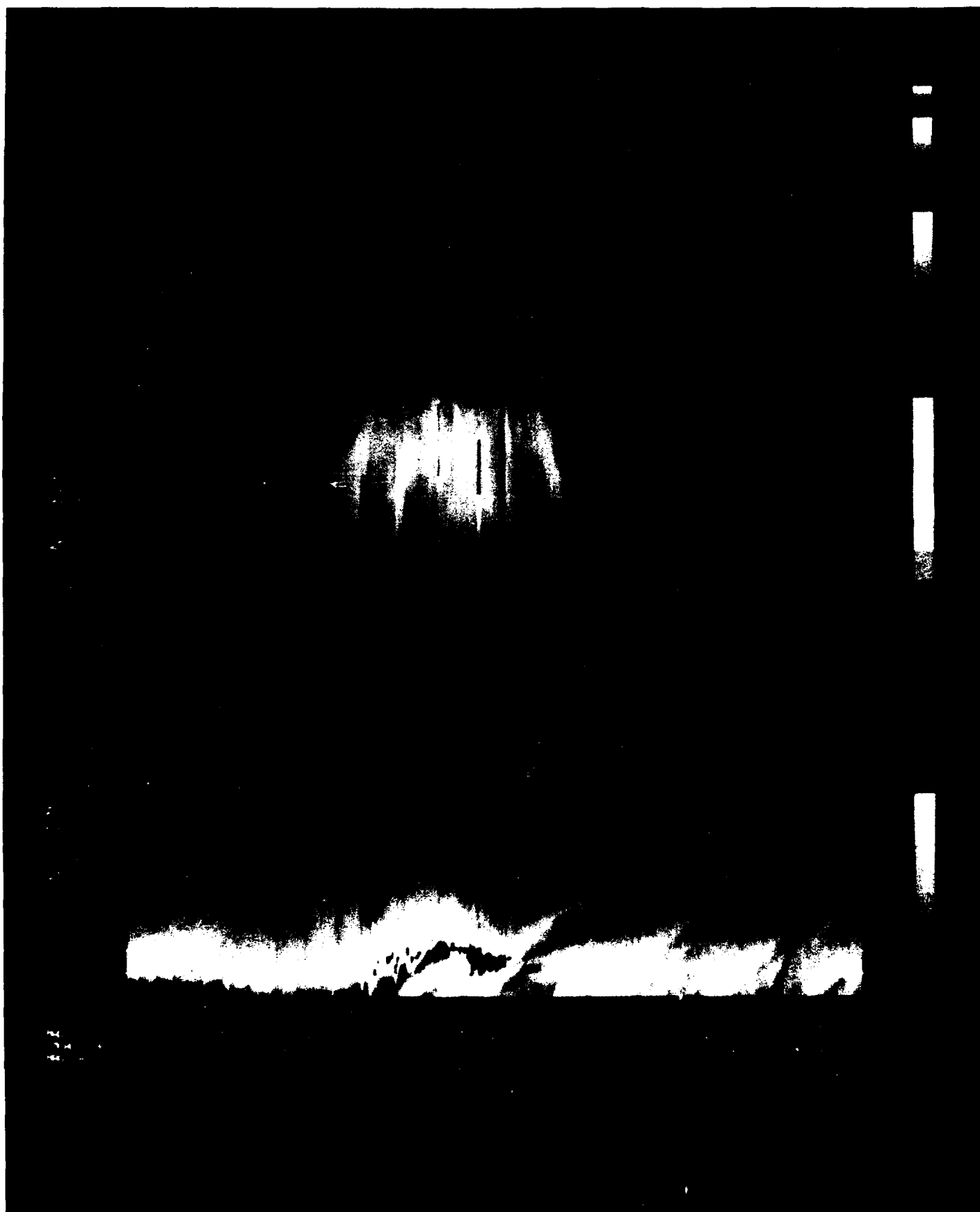


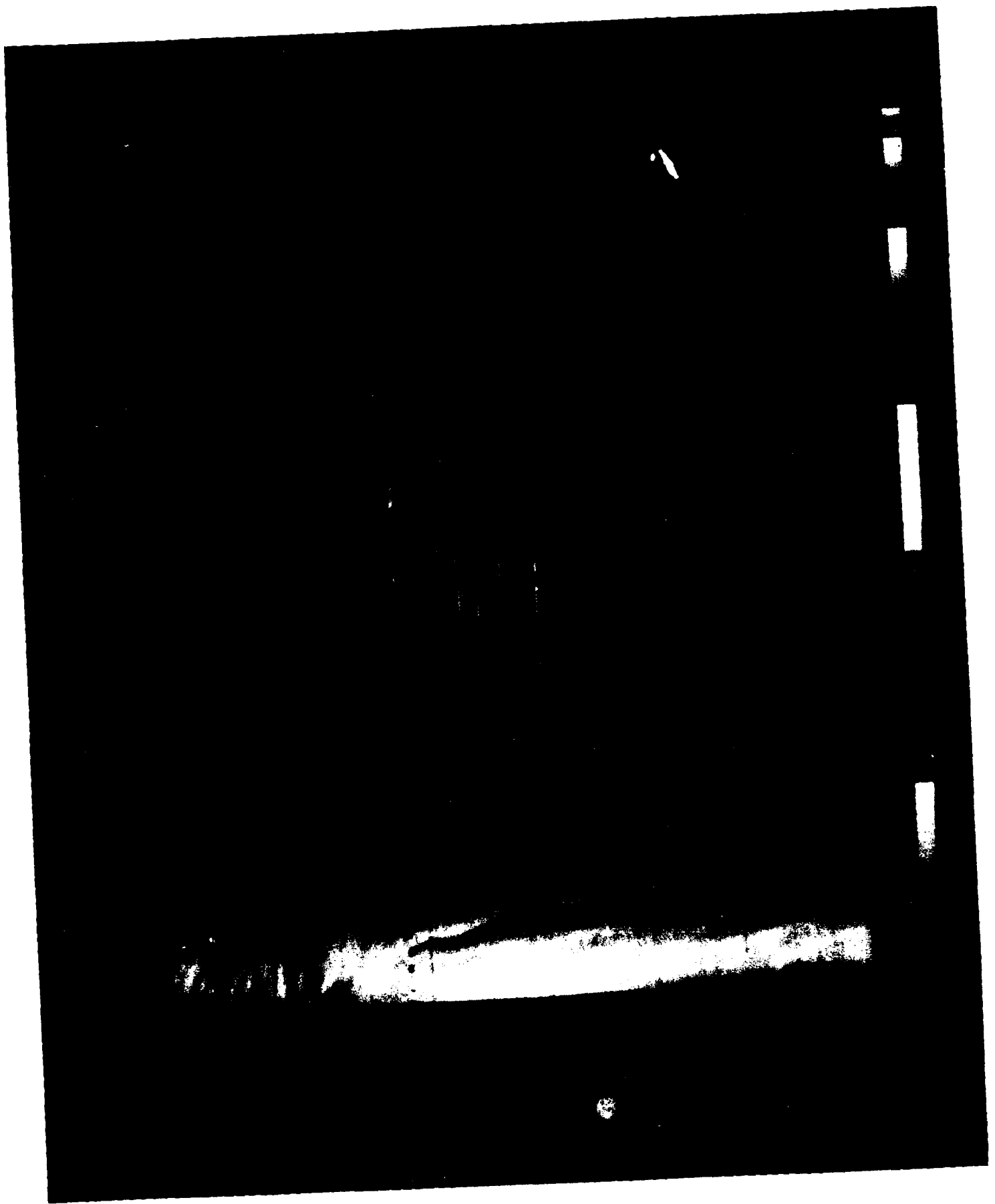


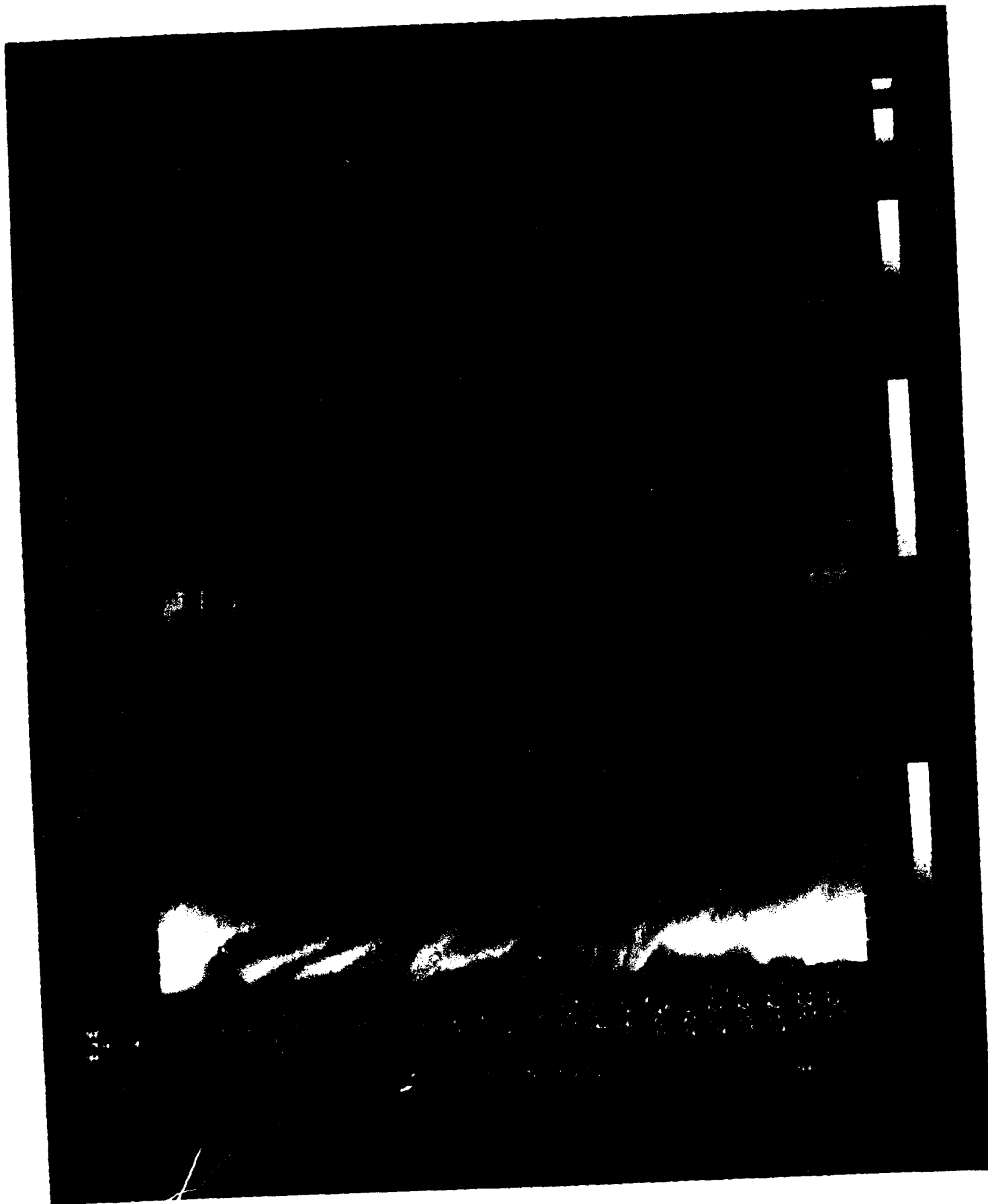


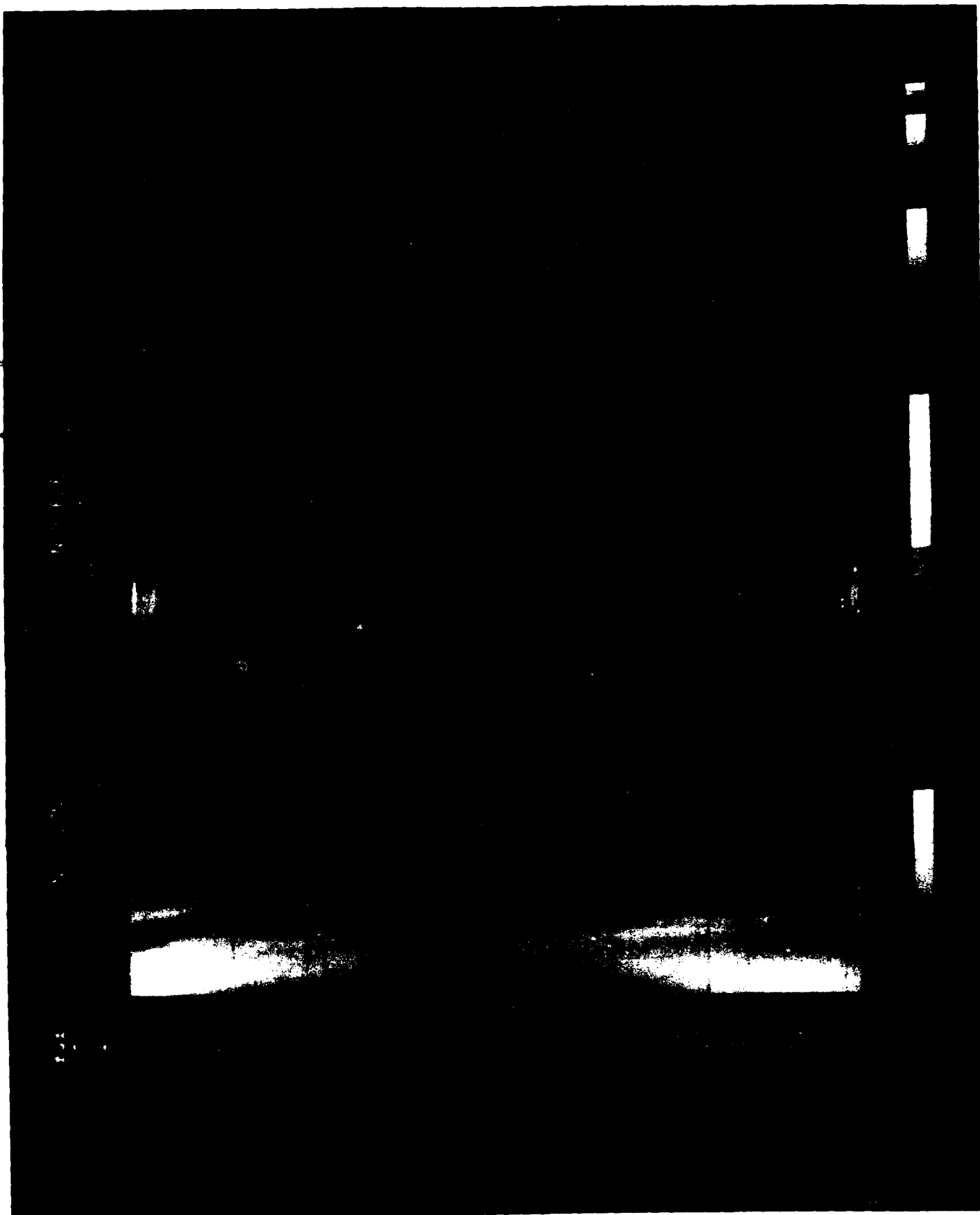


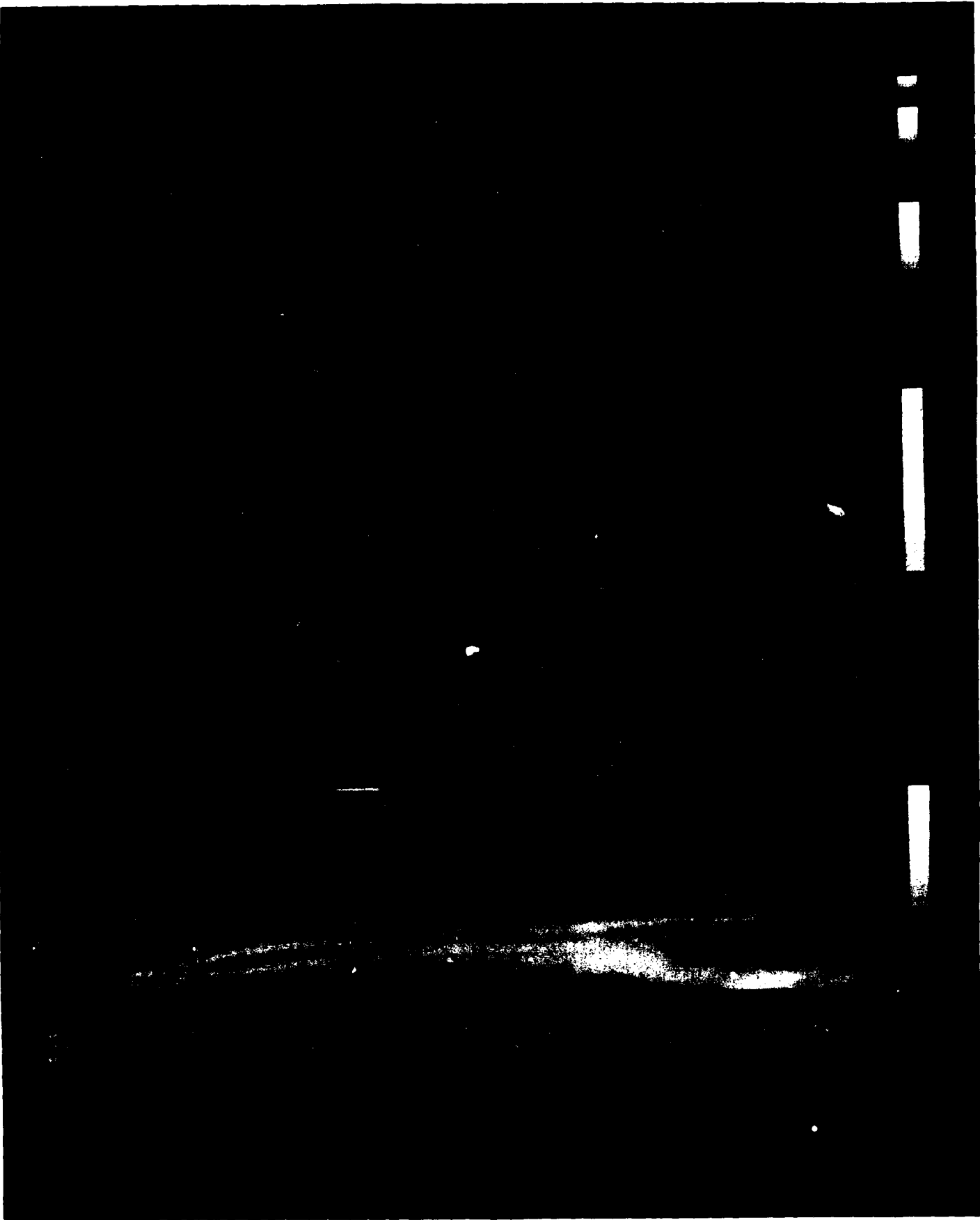


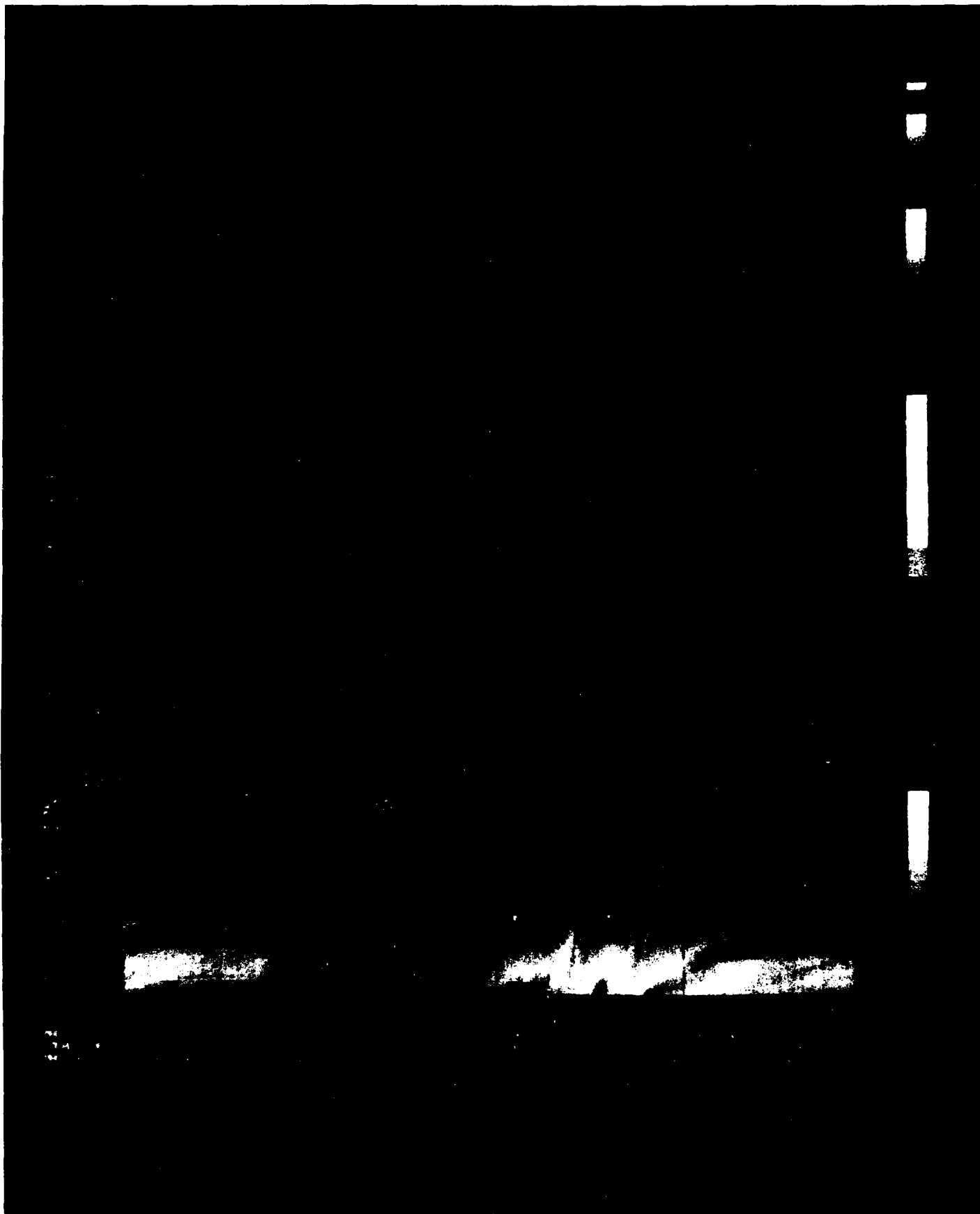












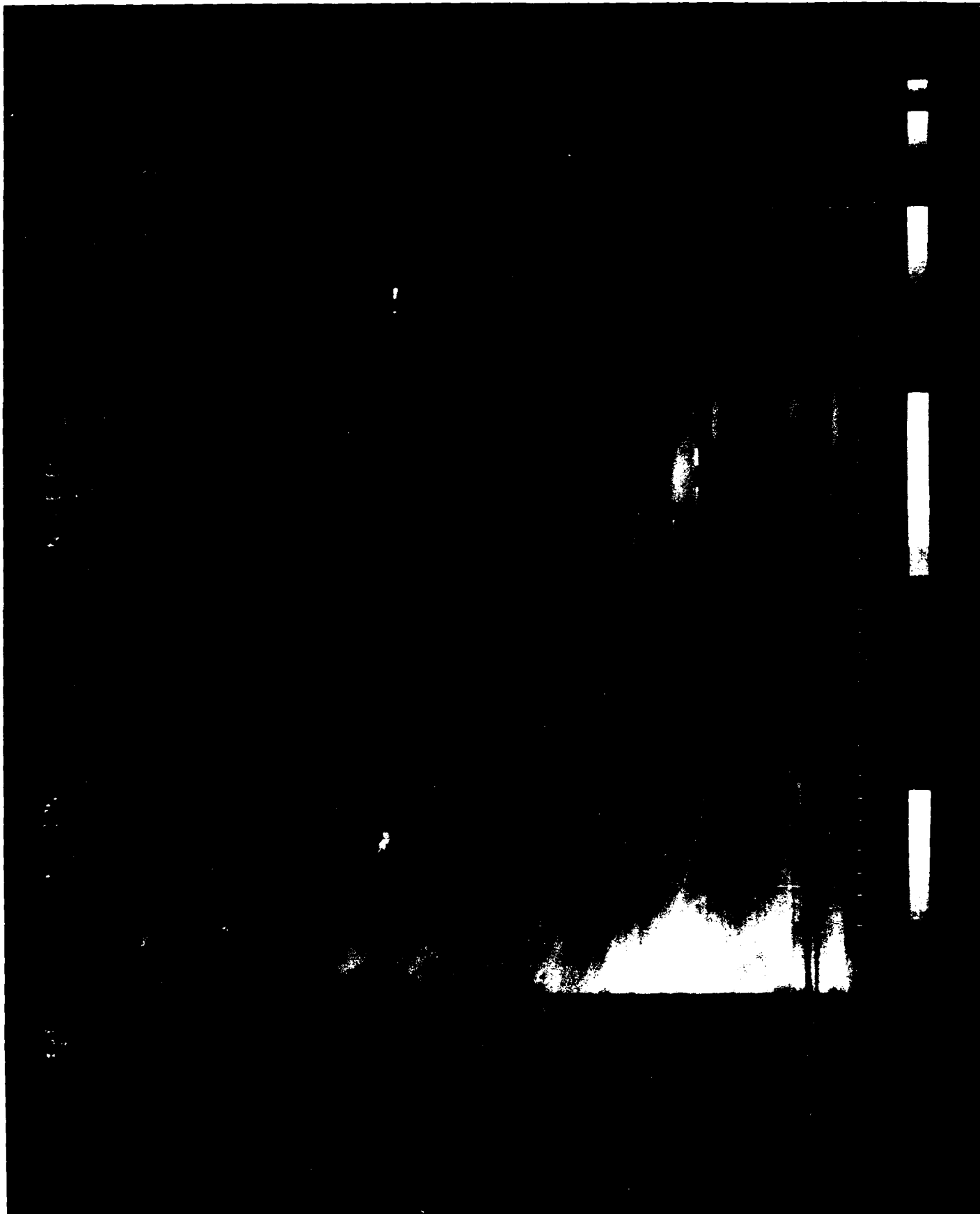
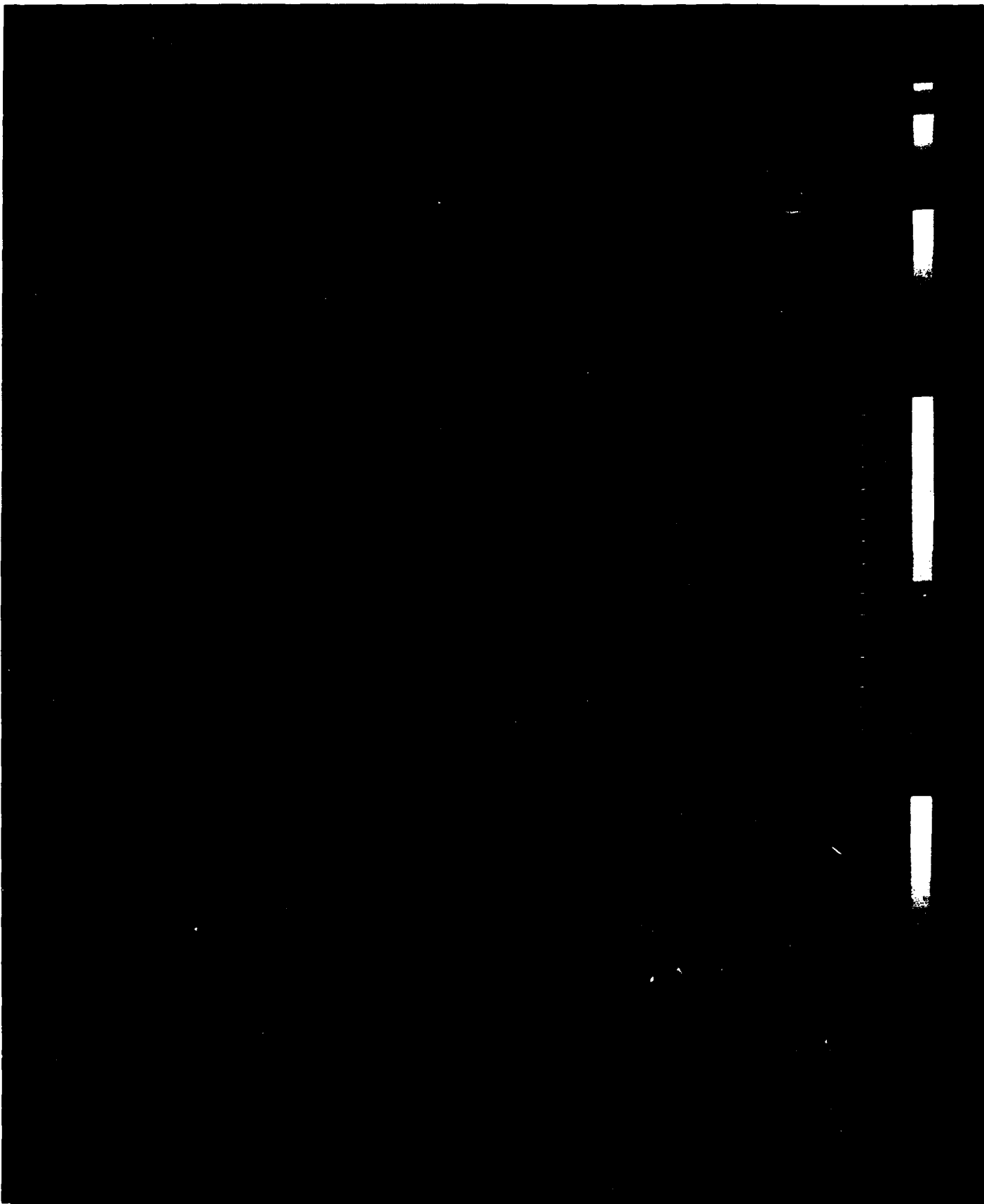
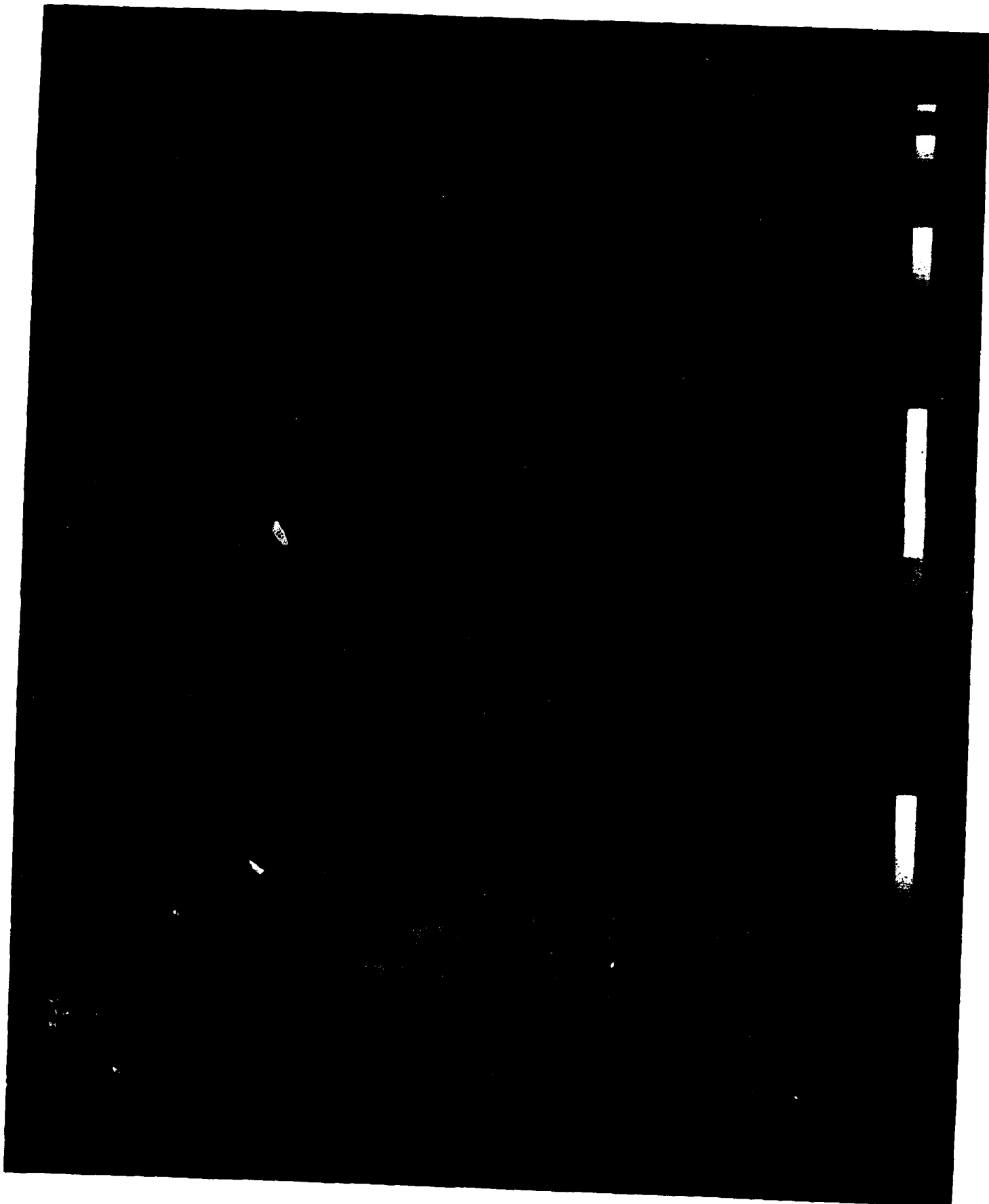
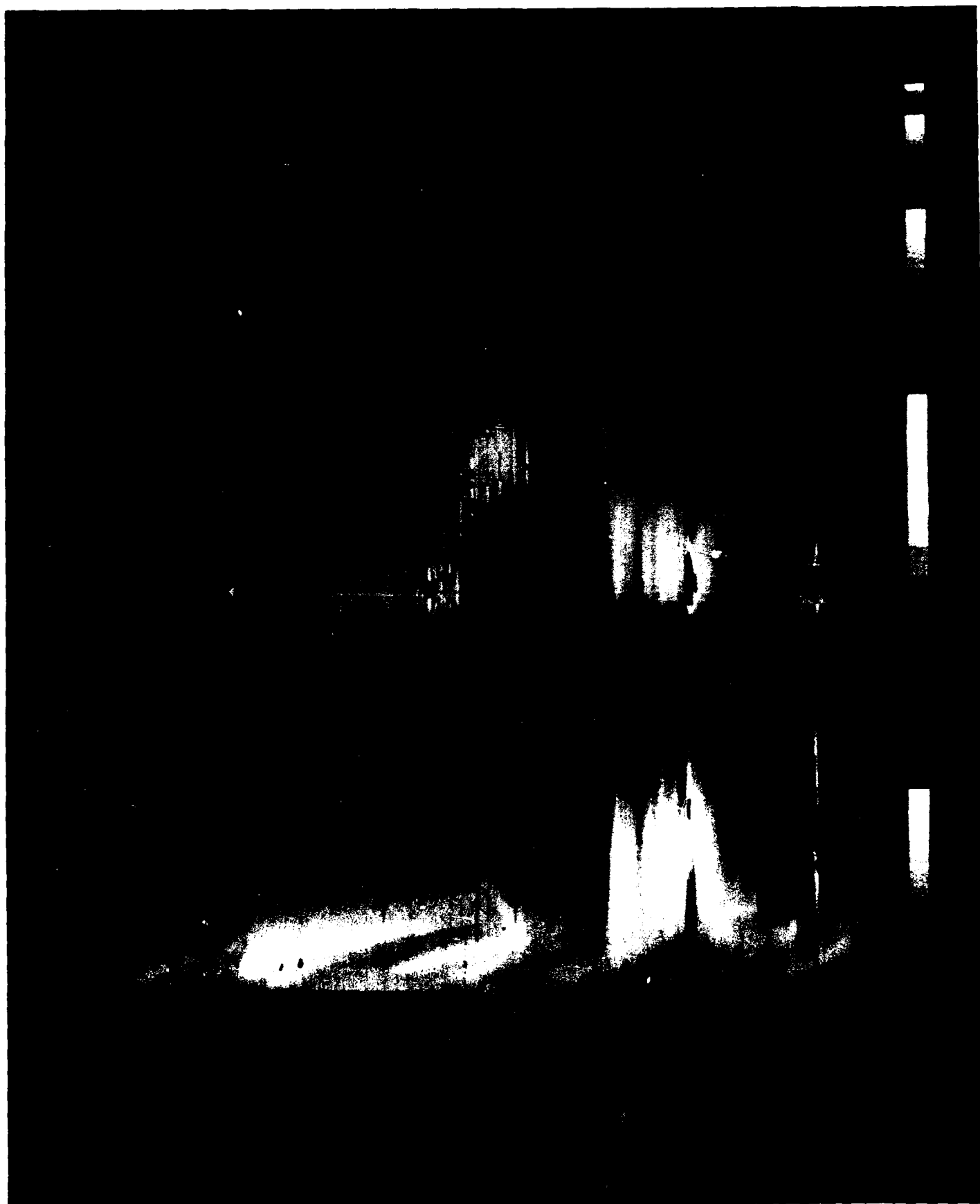
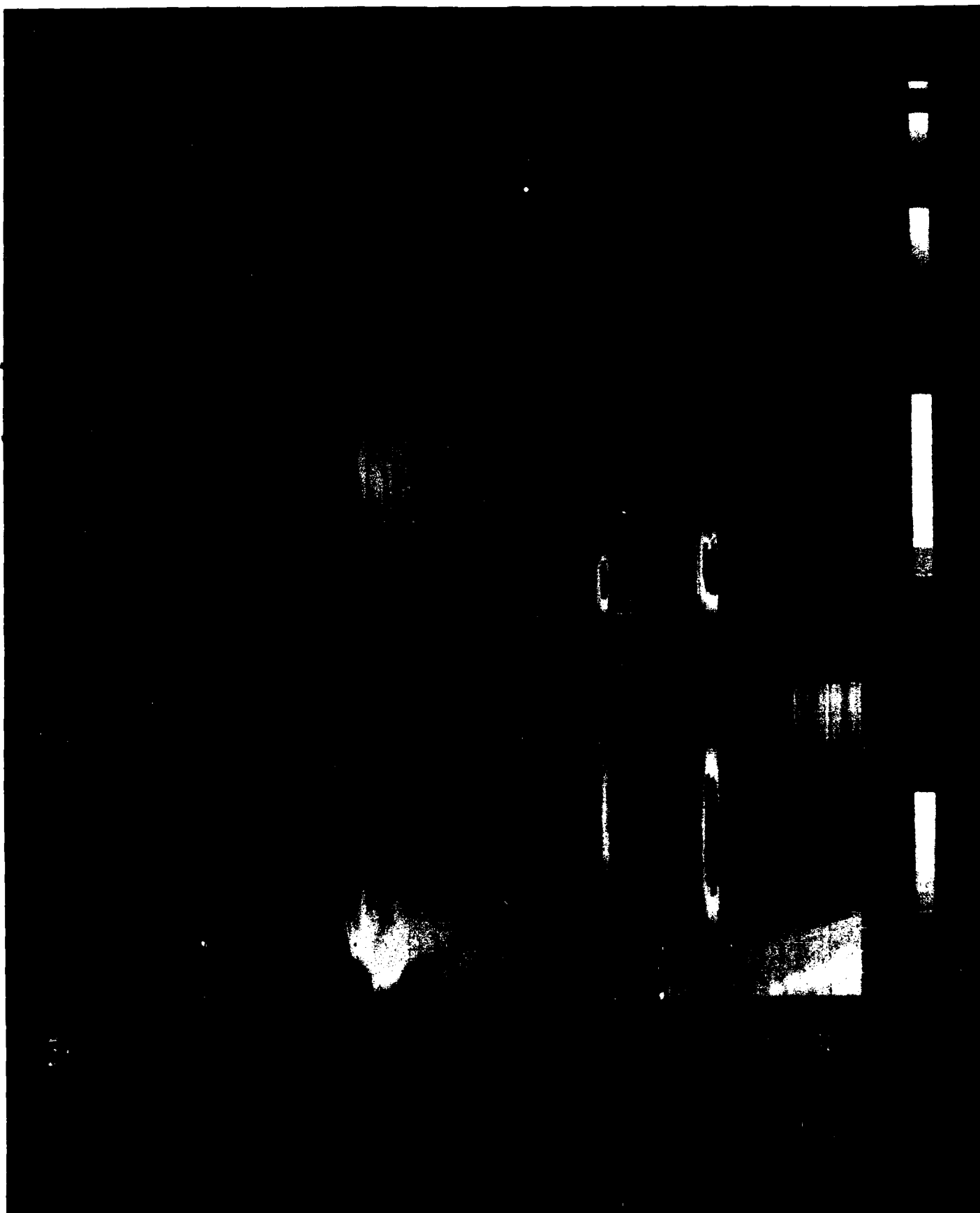


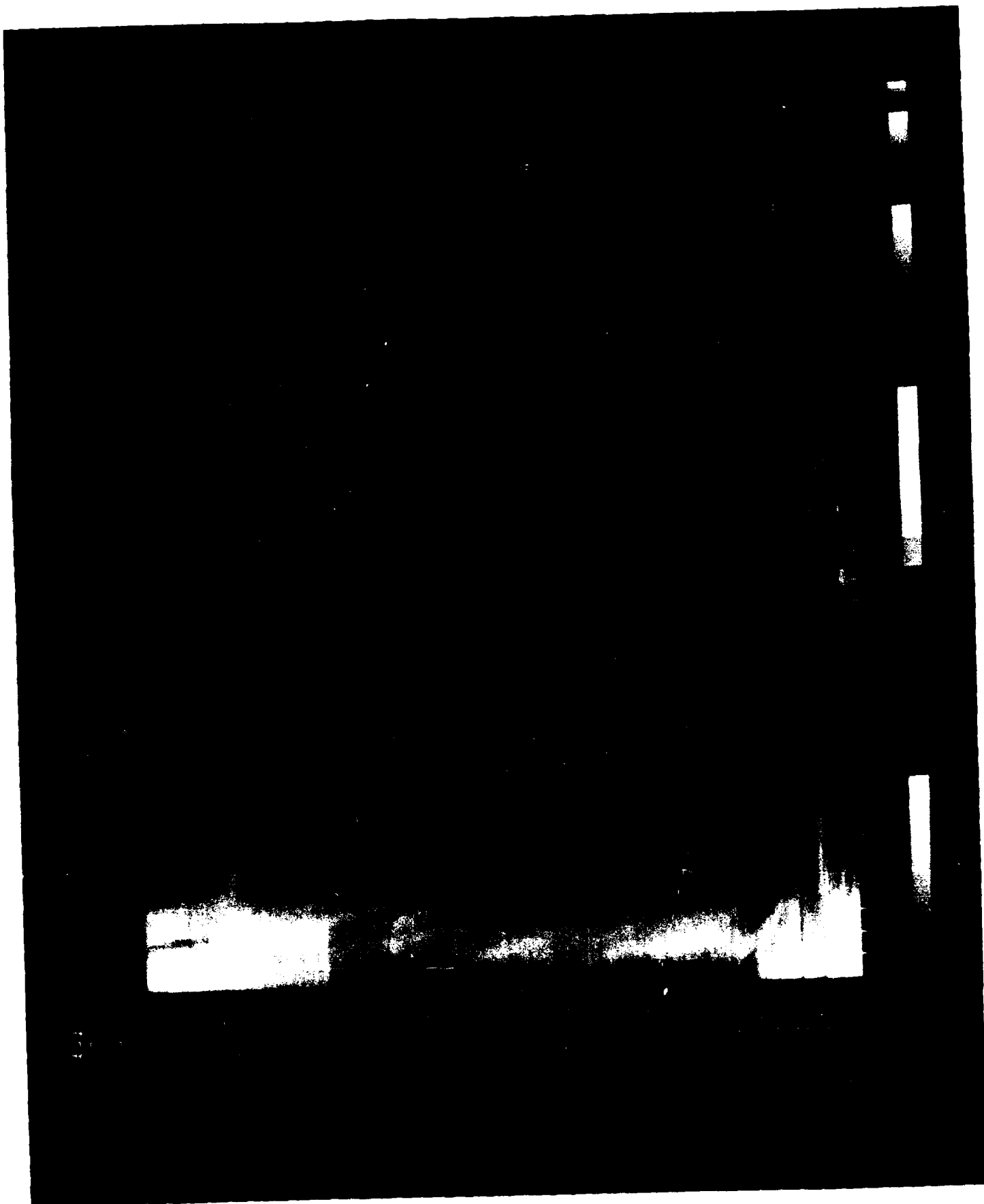
Figure 1 is a log-log plot showing the relationship between the N/S ratio (x-axis) and the N/S ELEC ratio (y-axis). The x-axis ranges from 1000 to 10000, and the y-axis ranges from 1000 to 10000. A solid line represents the theoretical relationship, and a dashed line represents the experimental data. The data points are clustered around the theoretical line, showing a positive correlation.

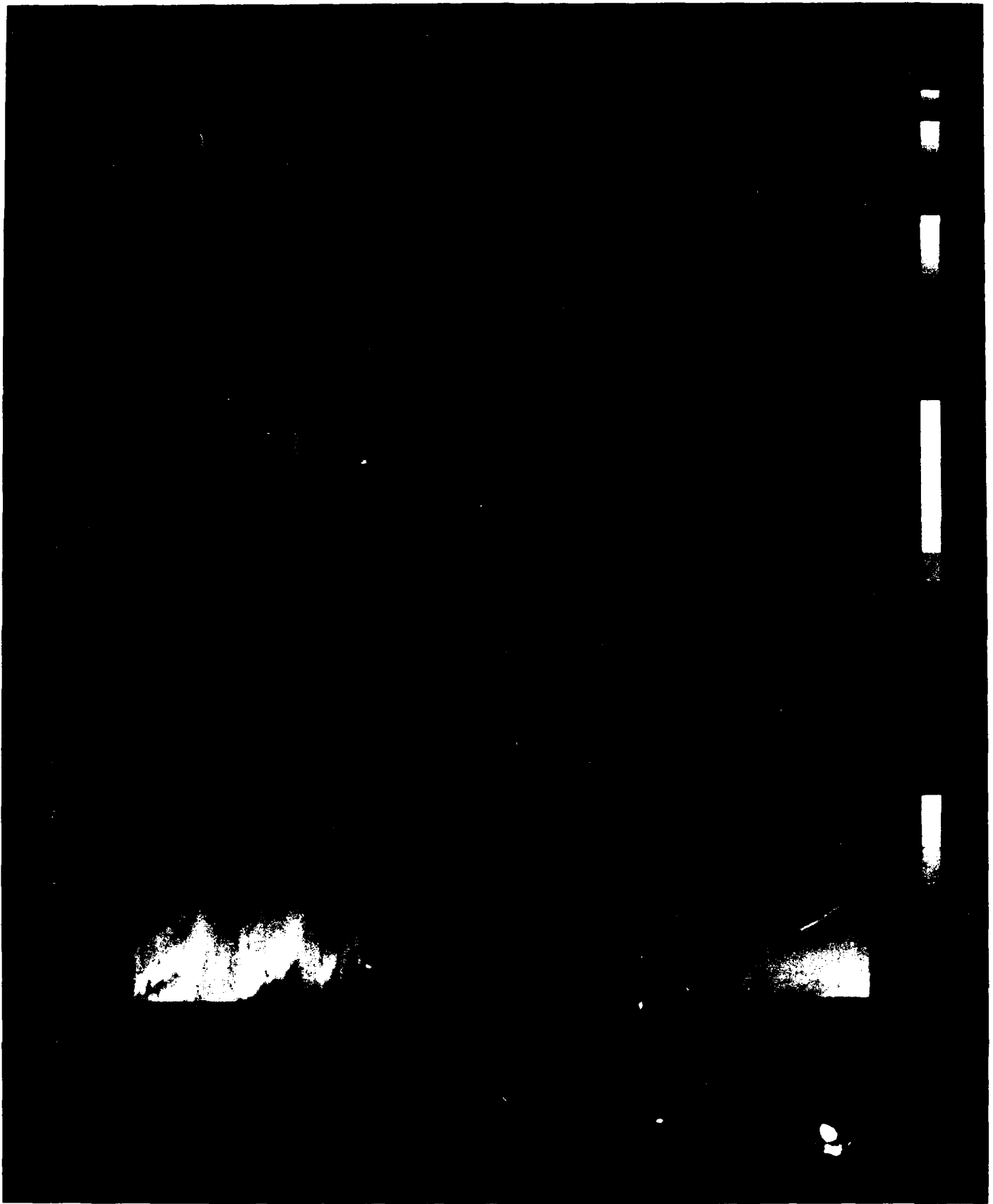


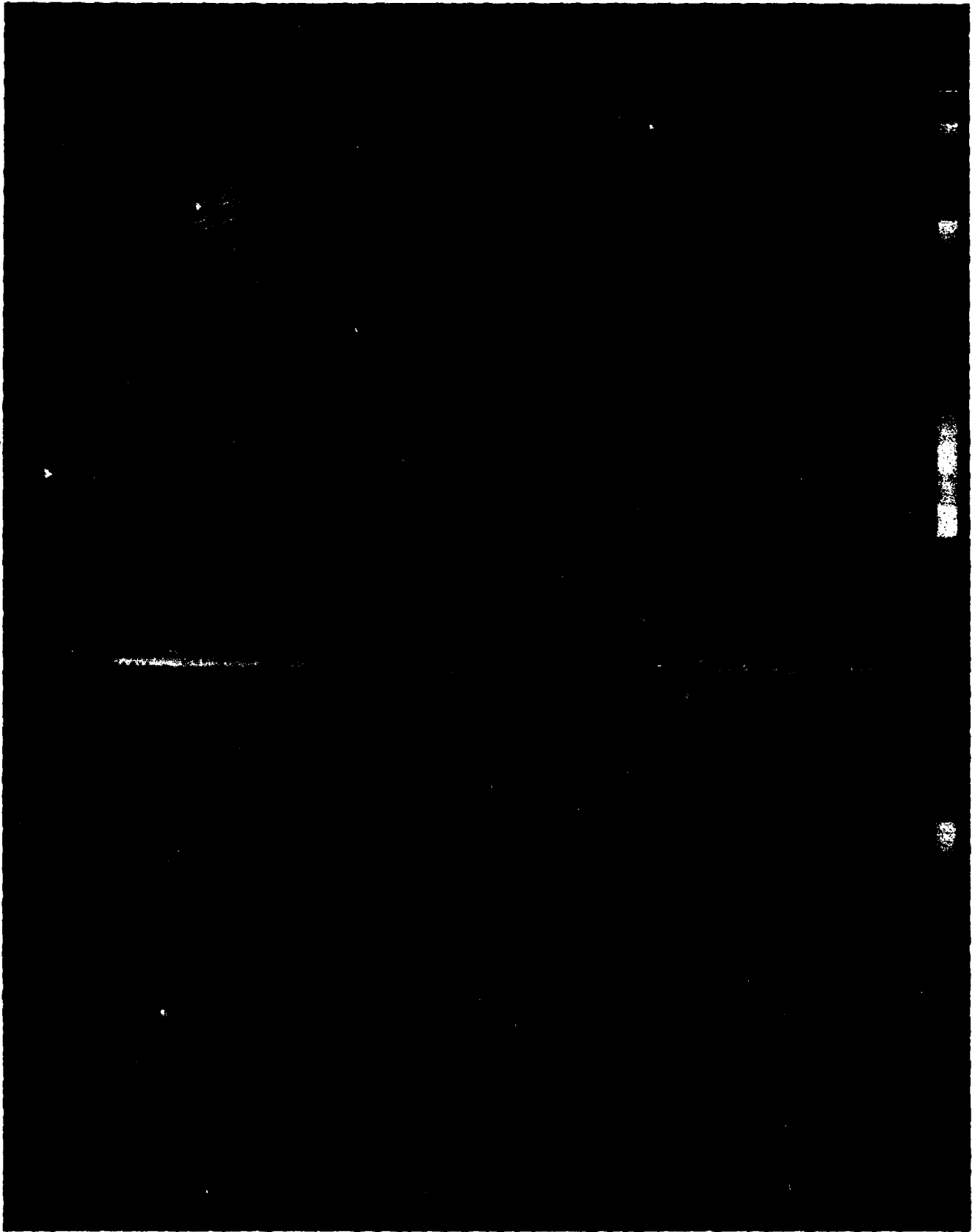


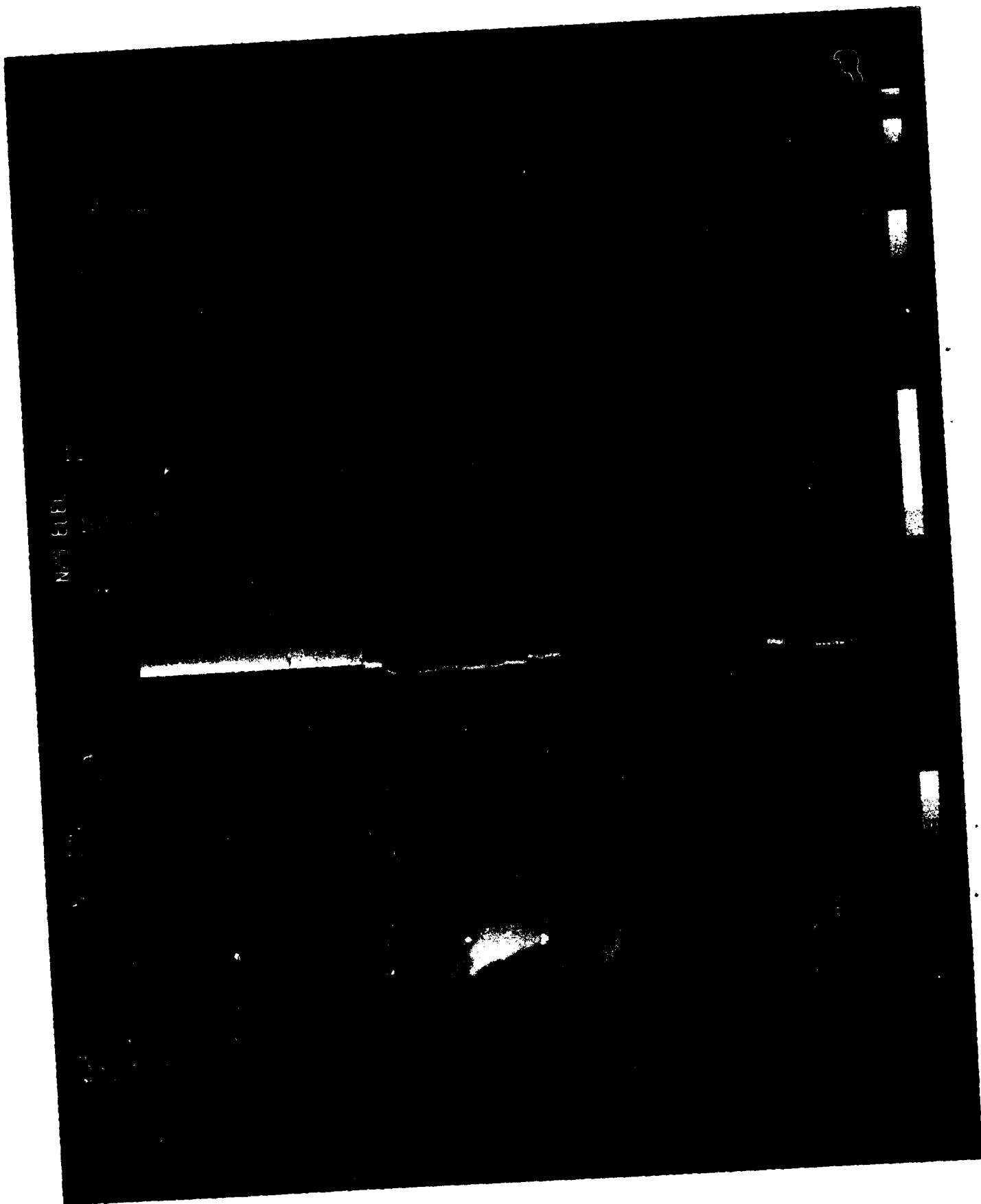


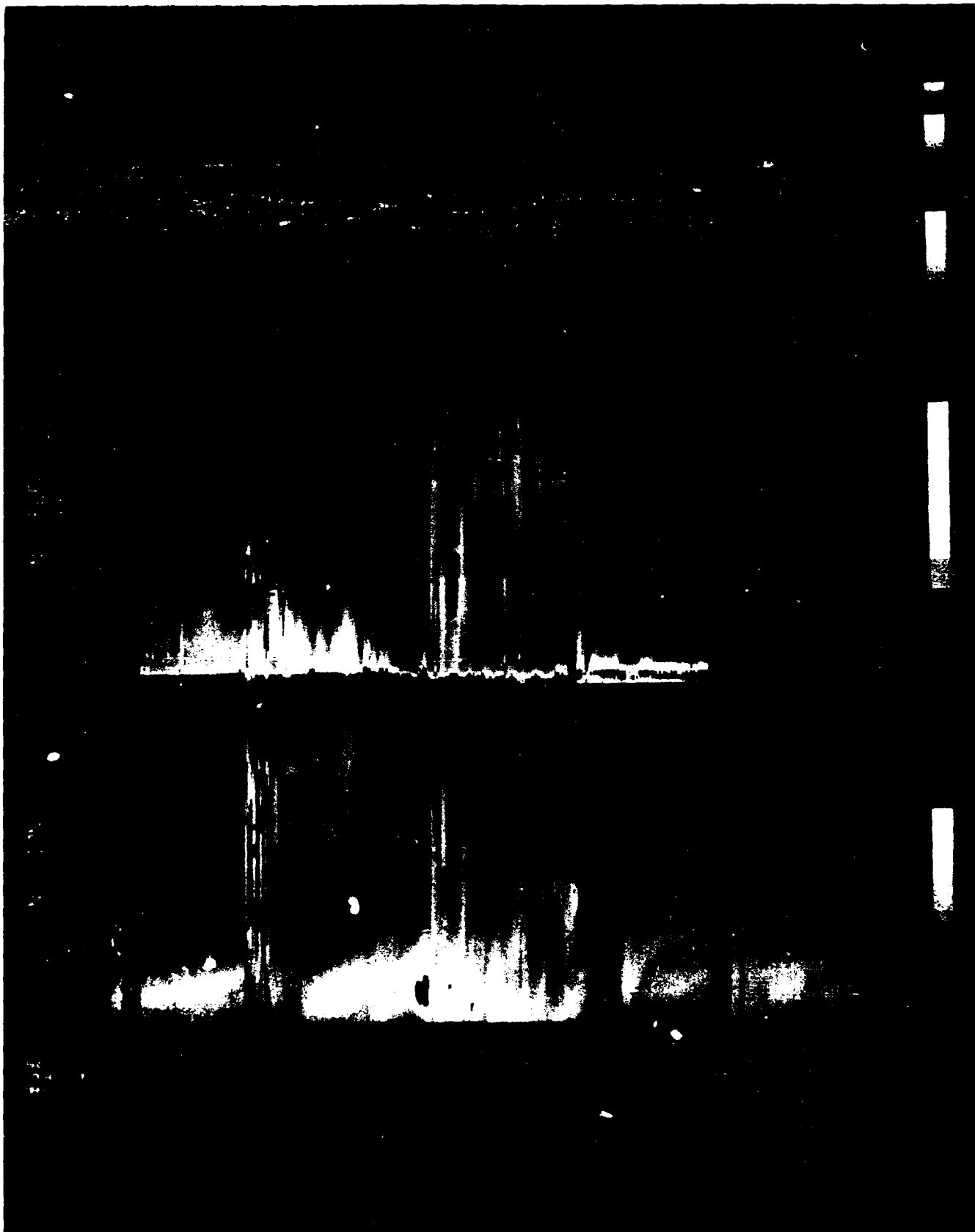


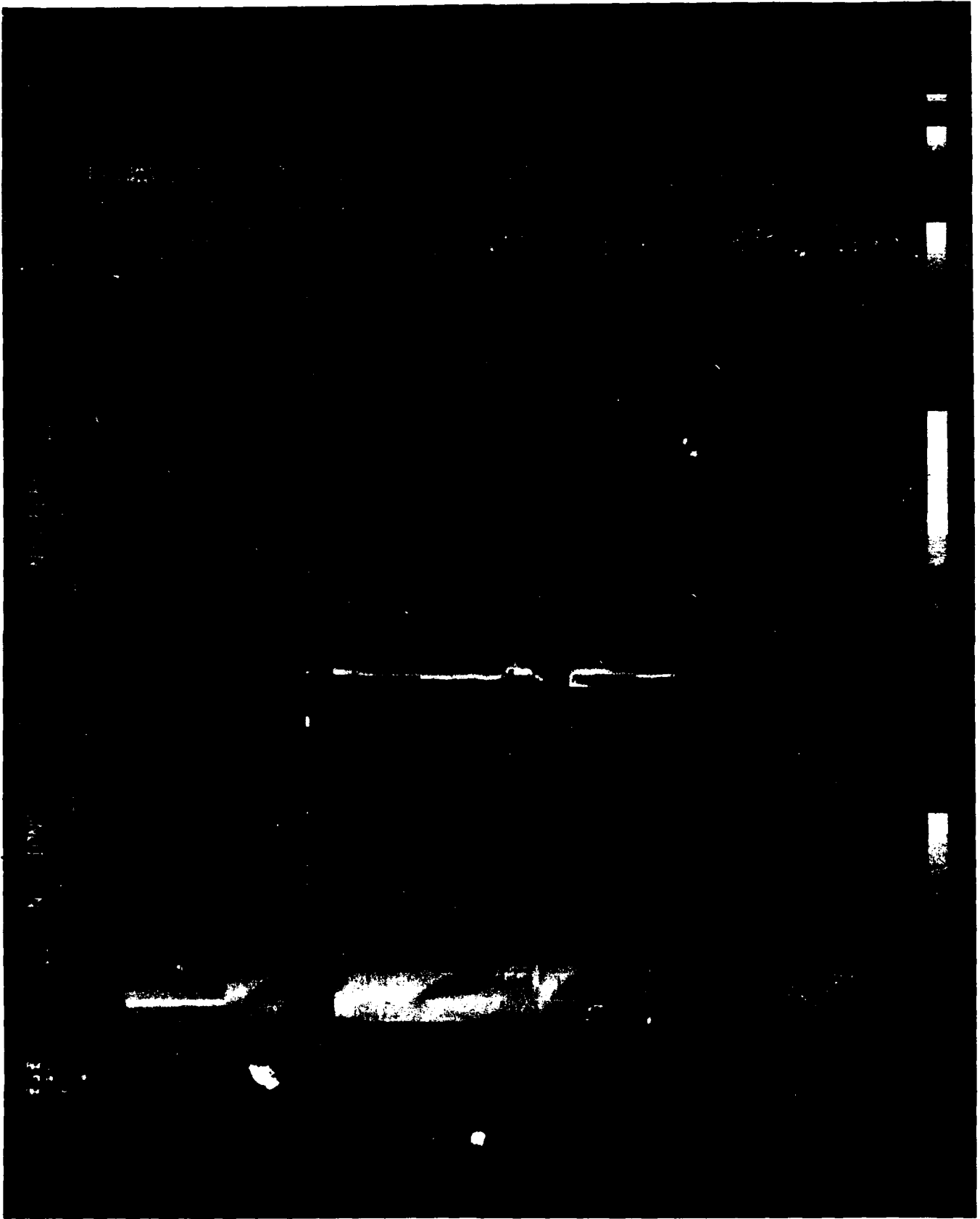


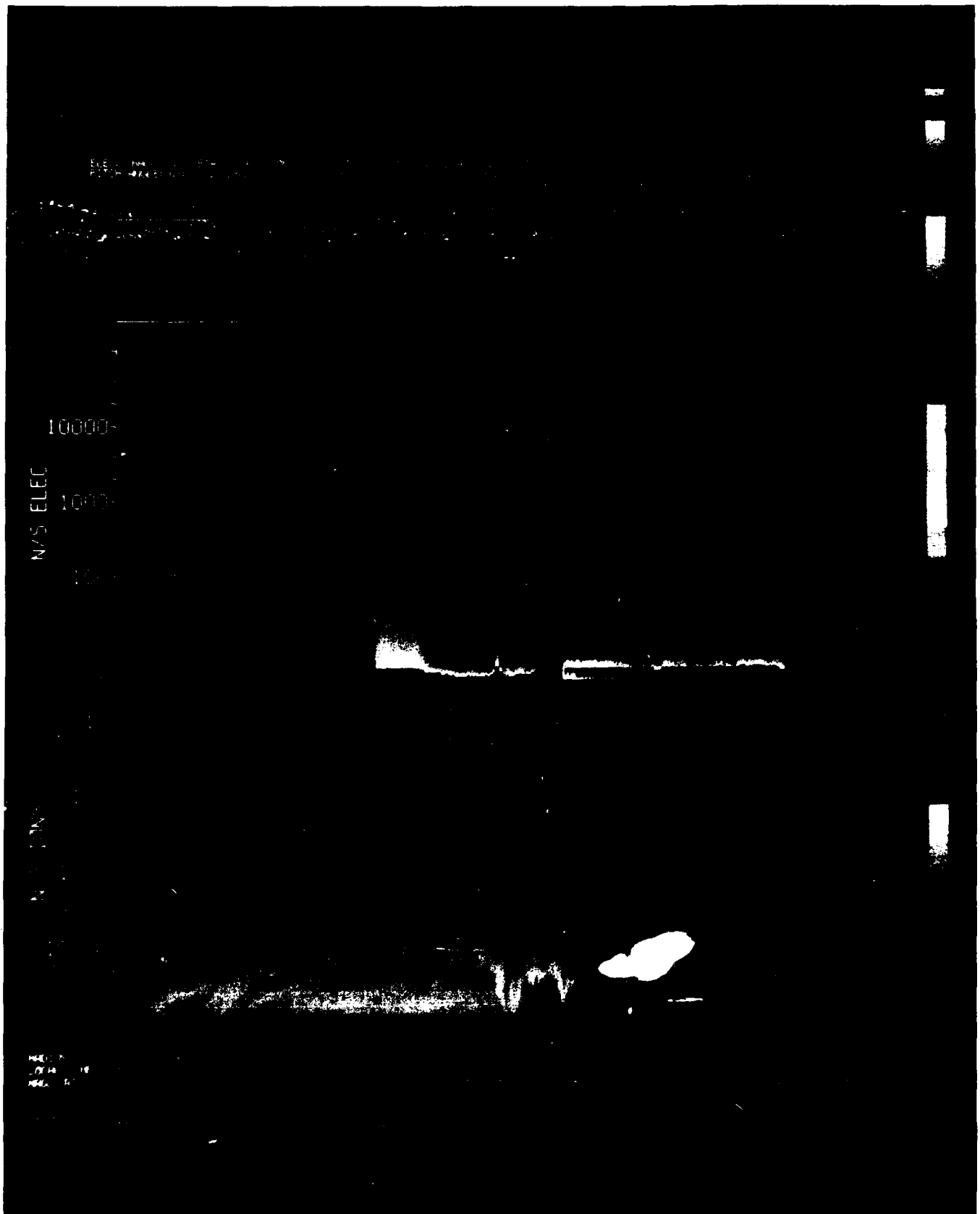


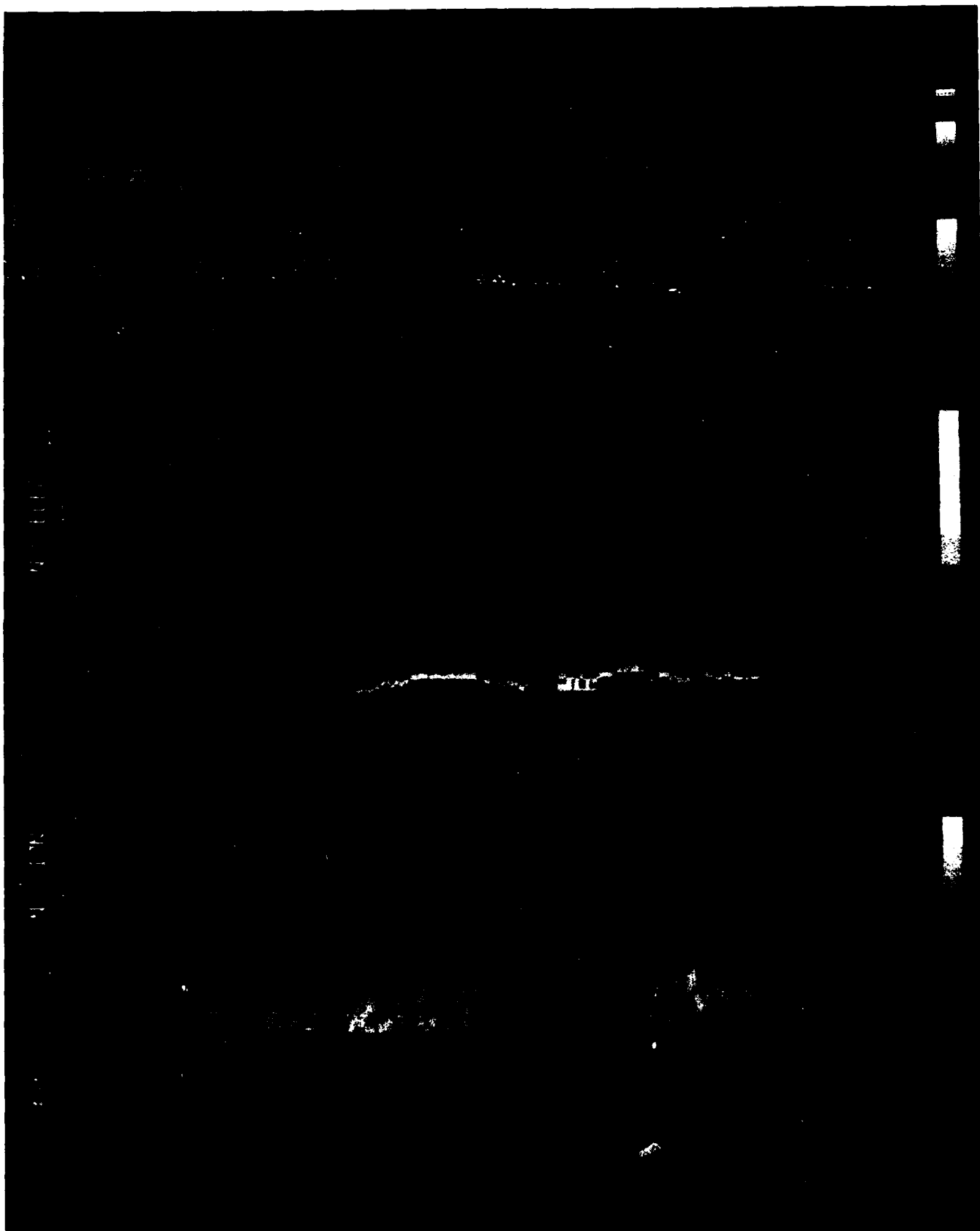


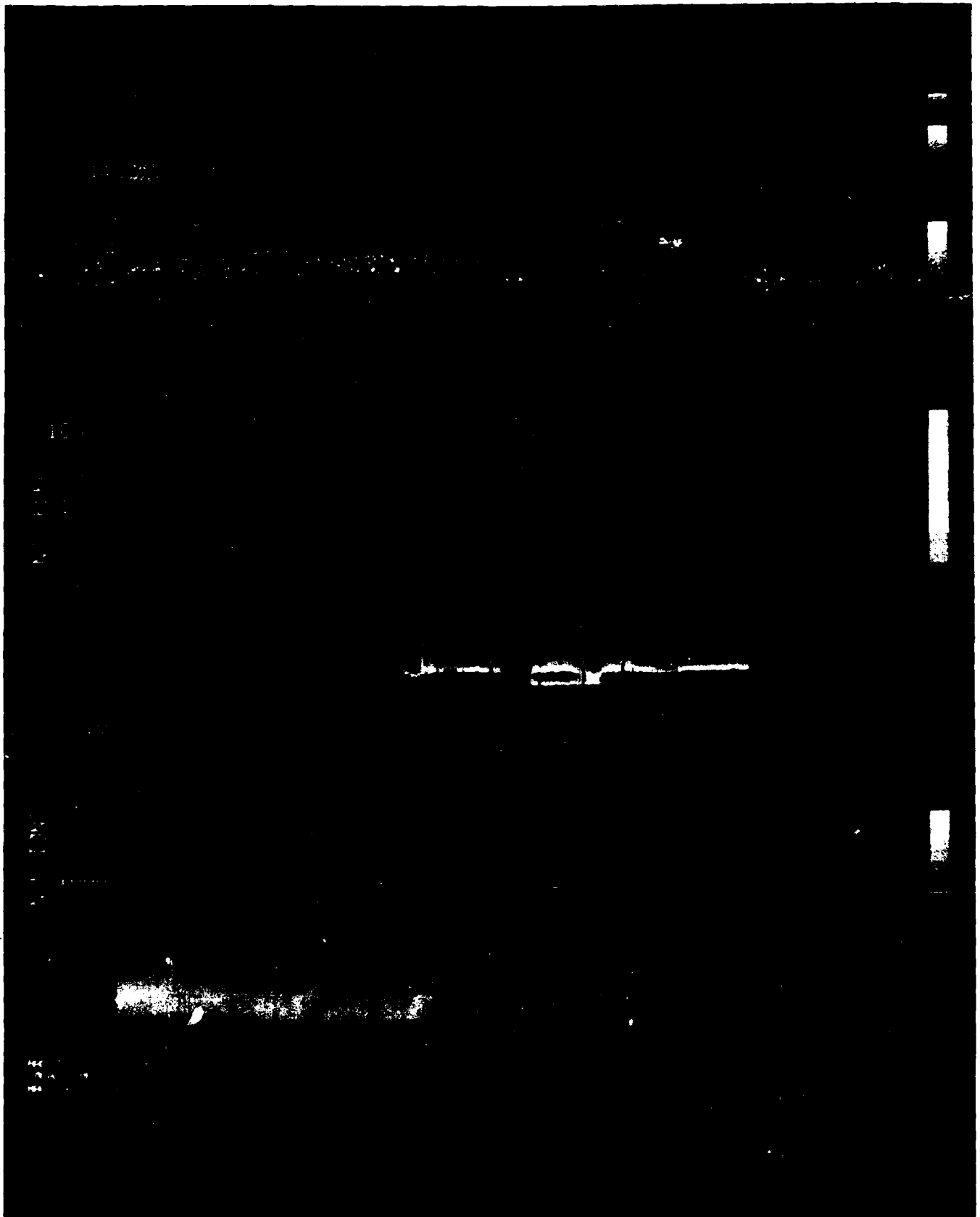


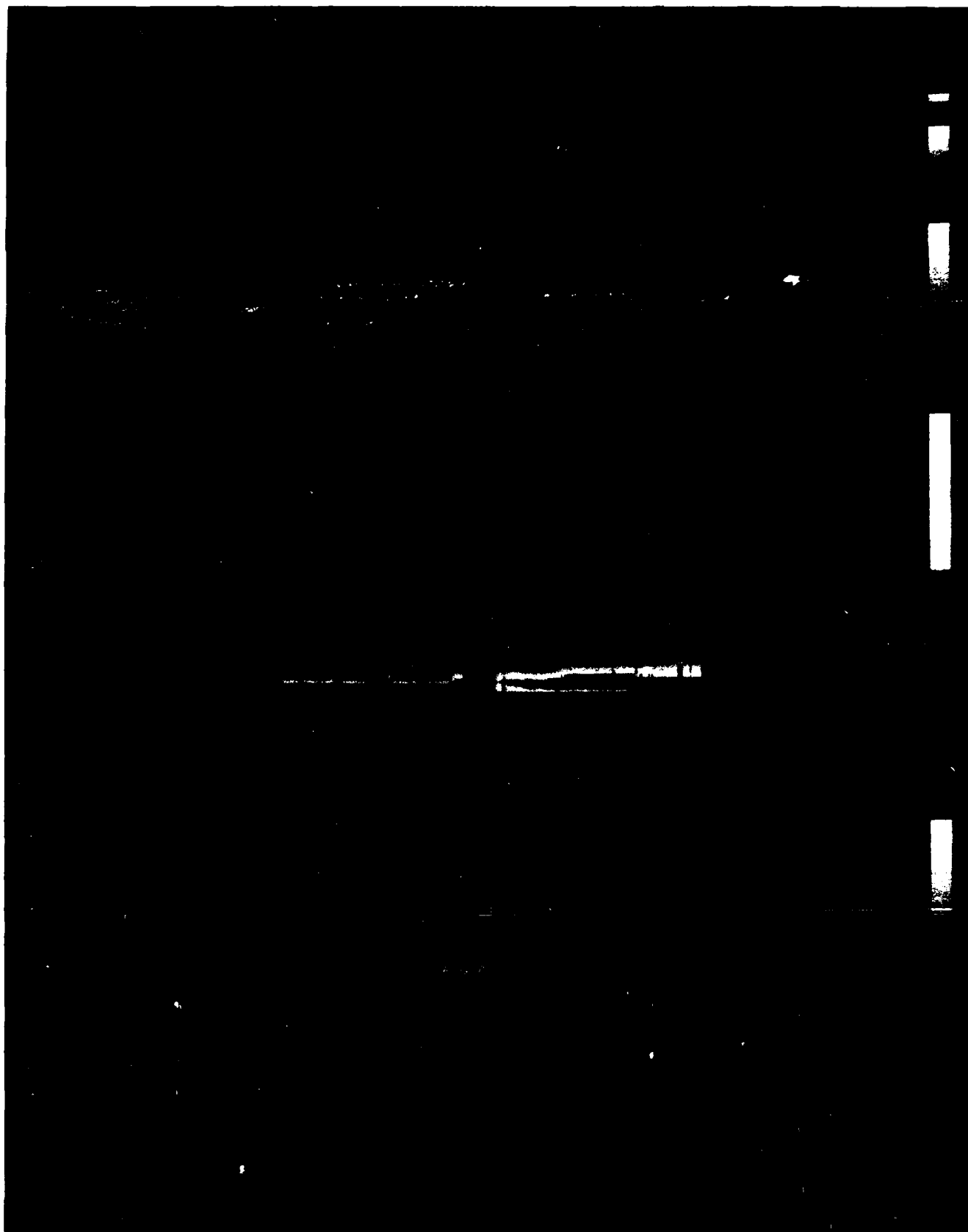


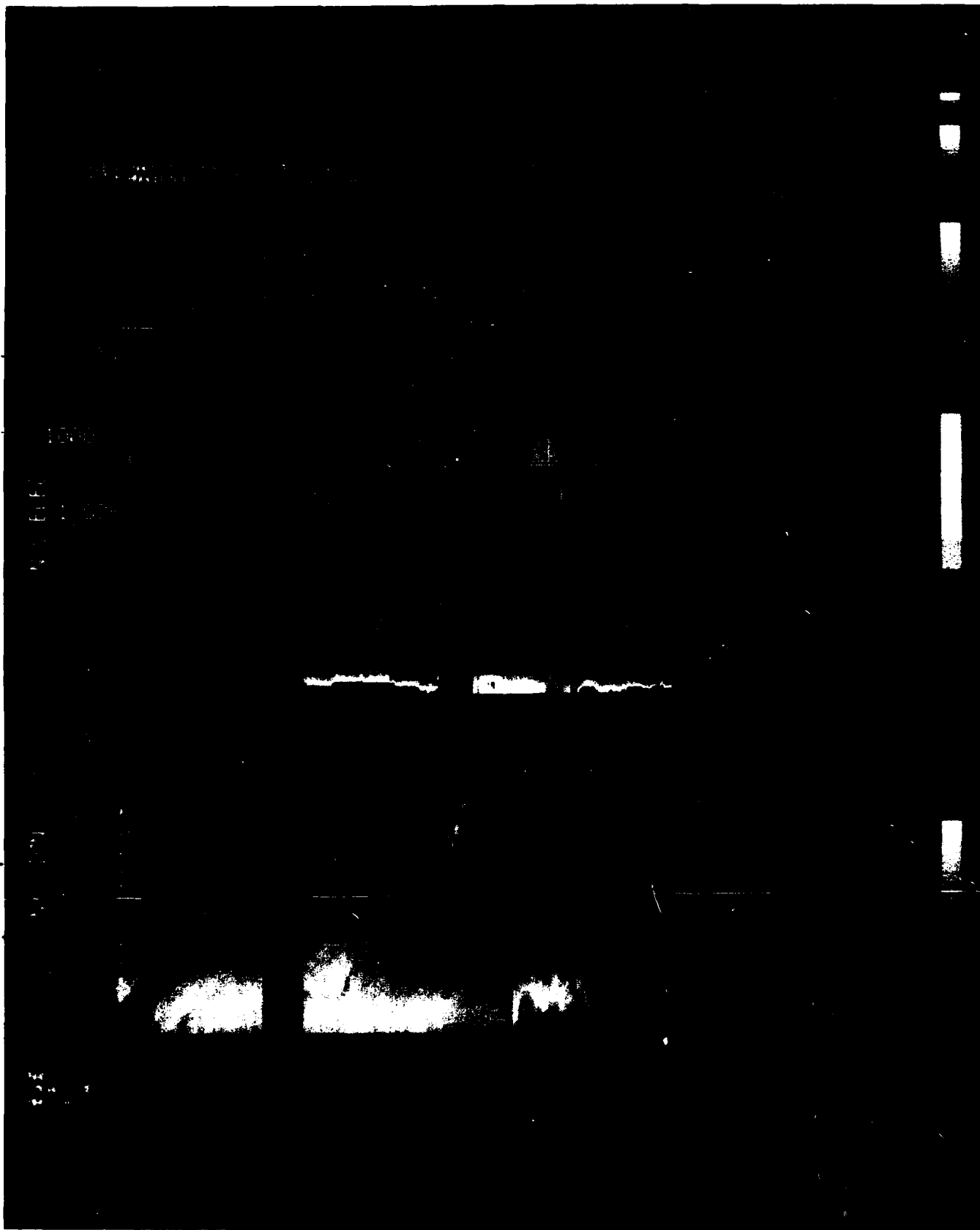


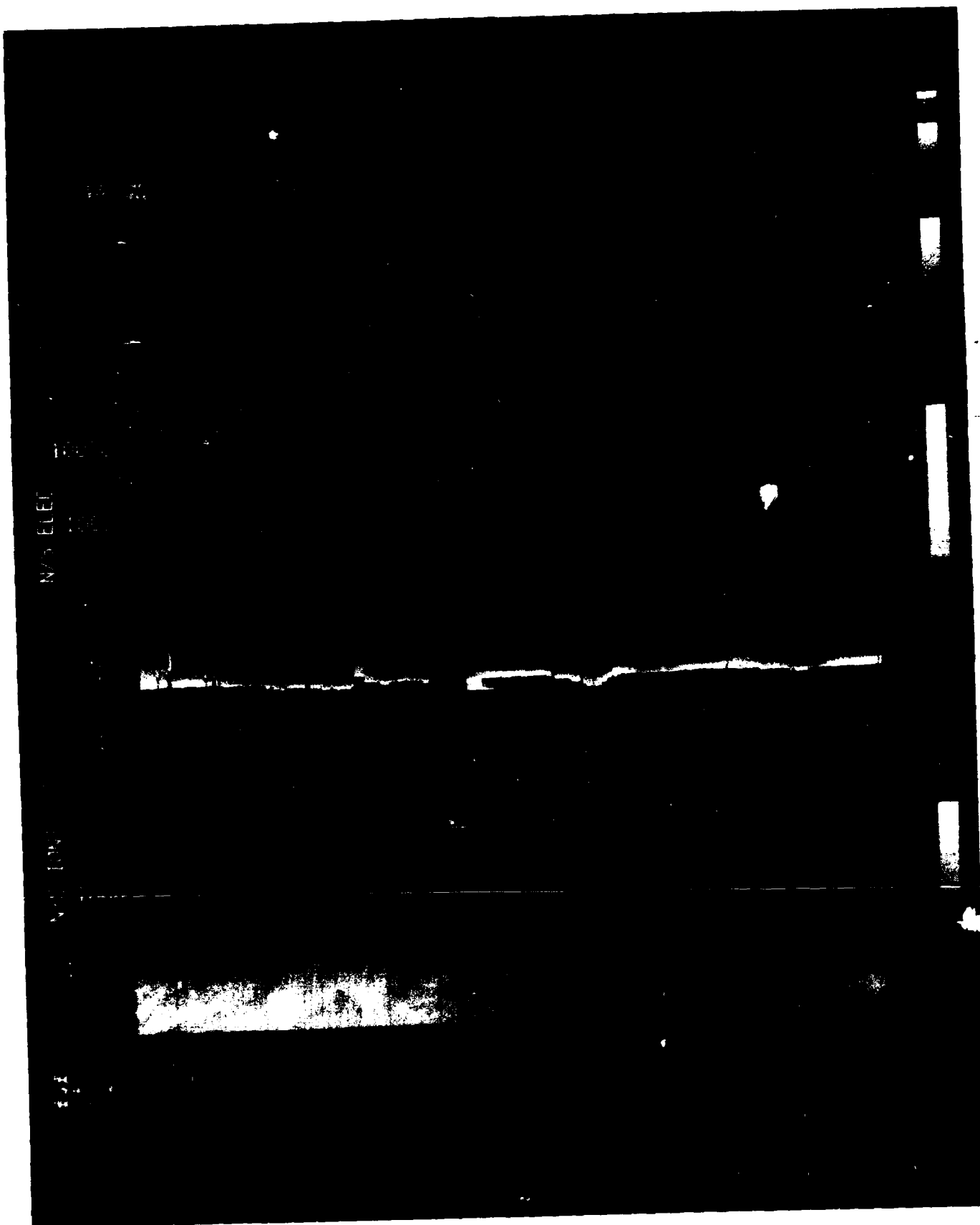


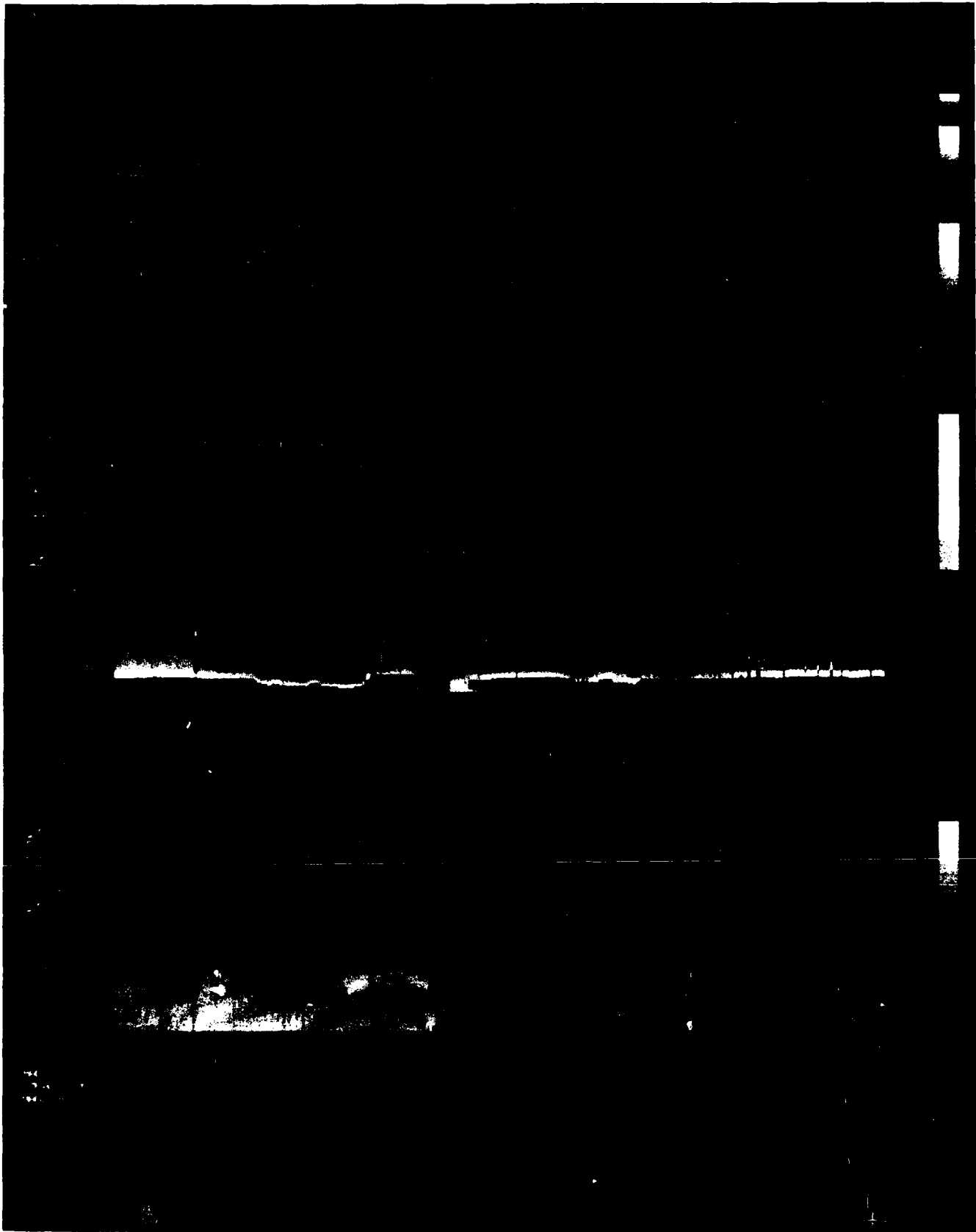


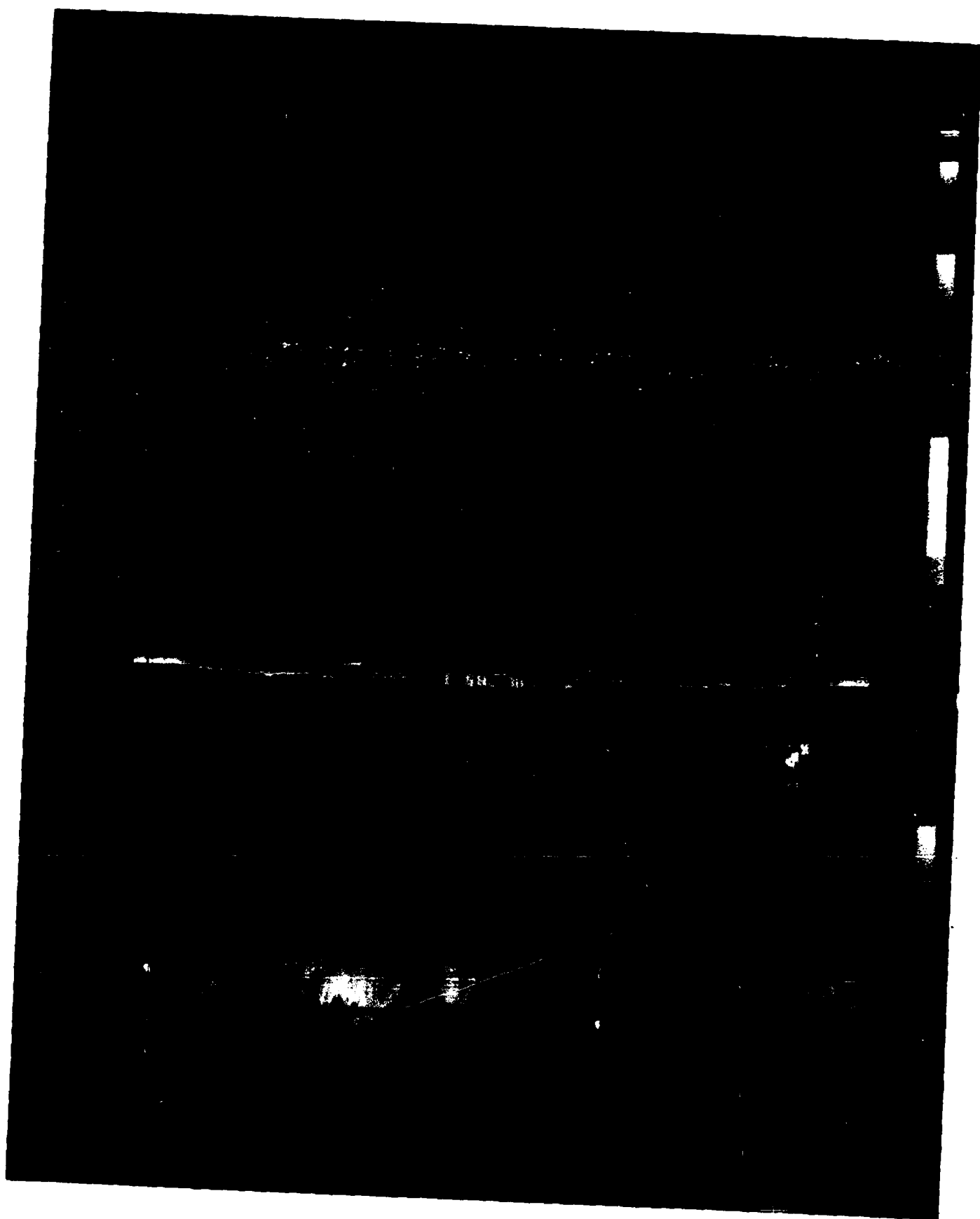


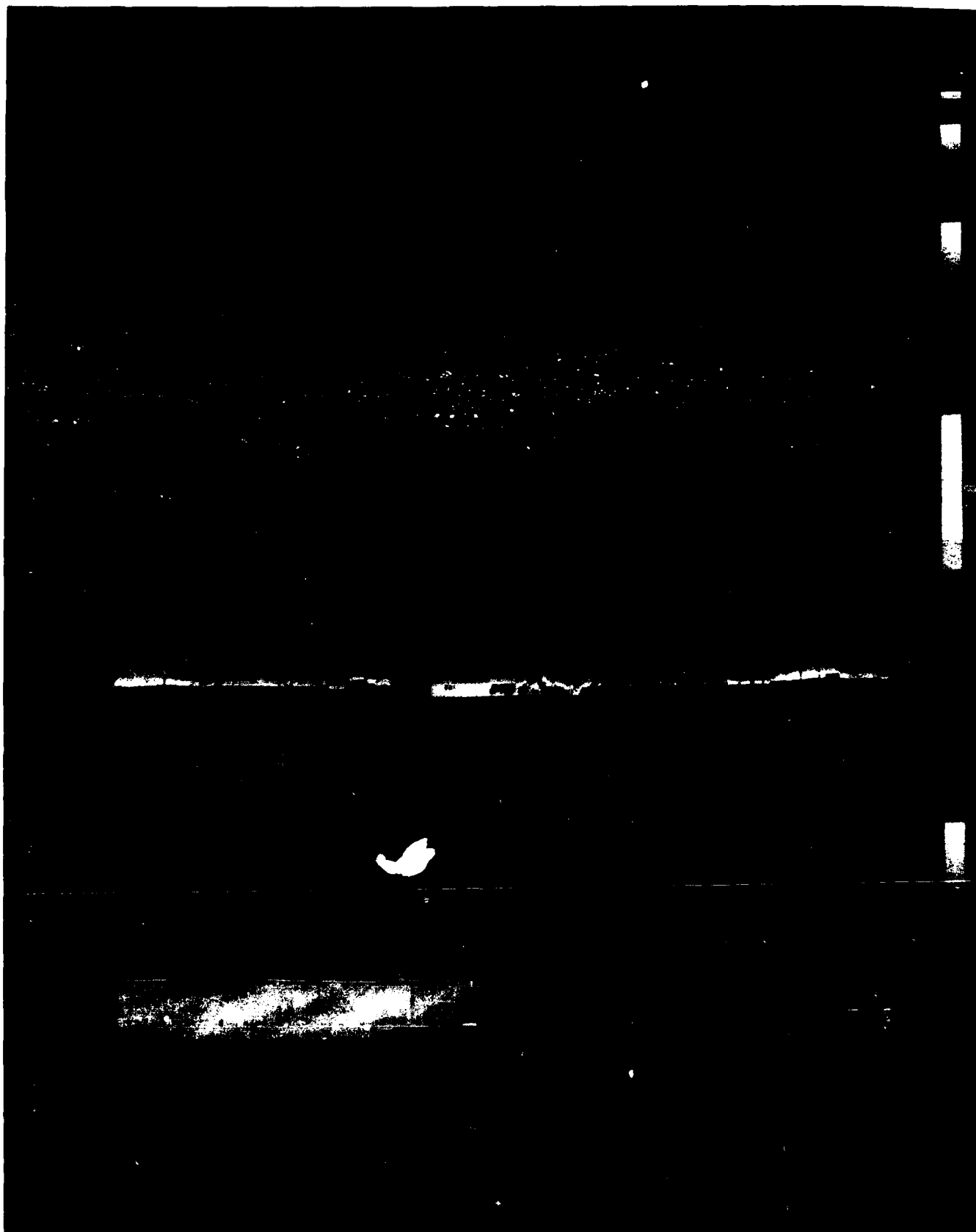


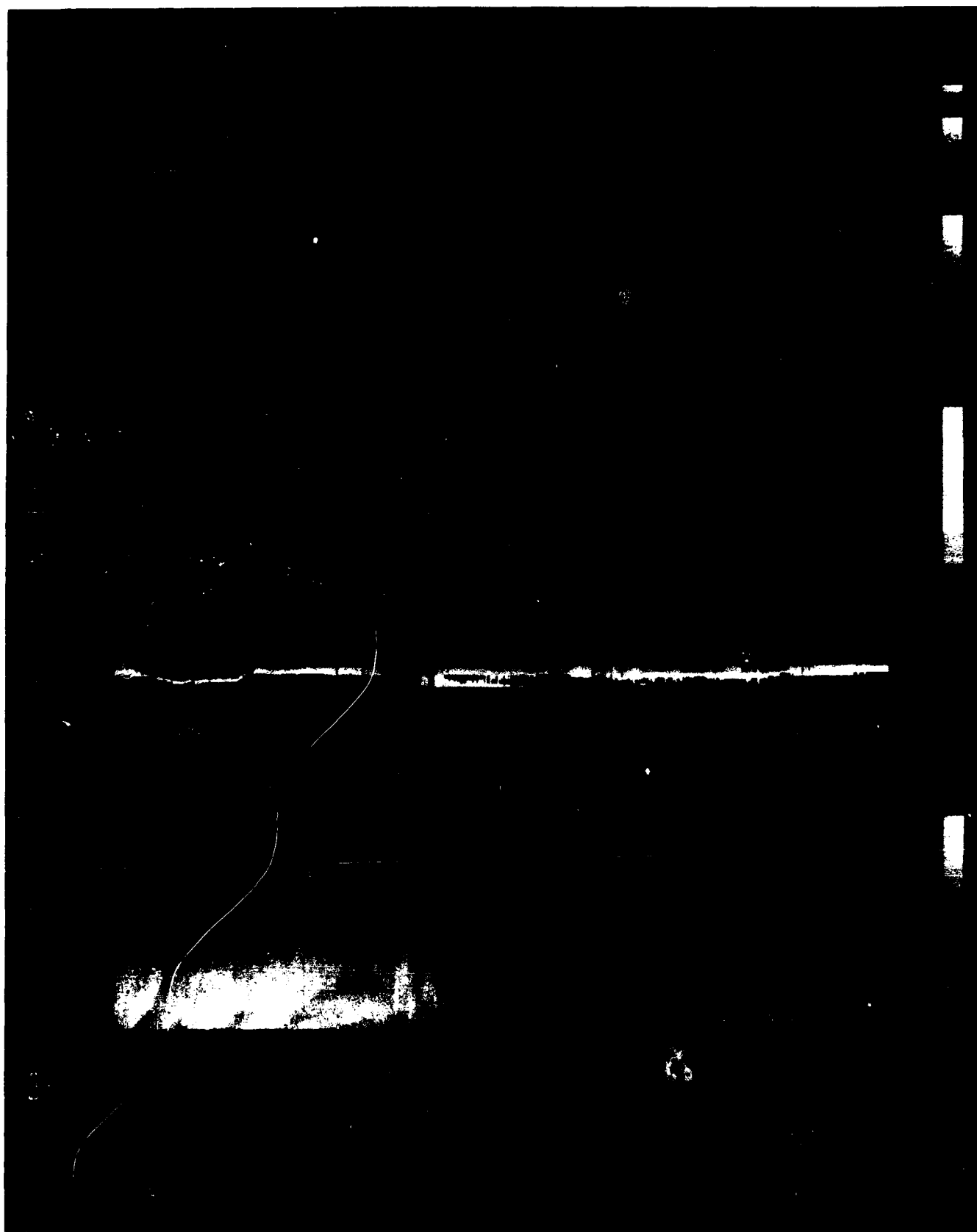


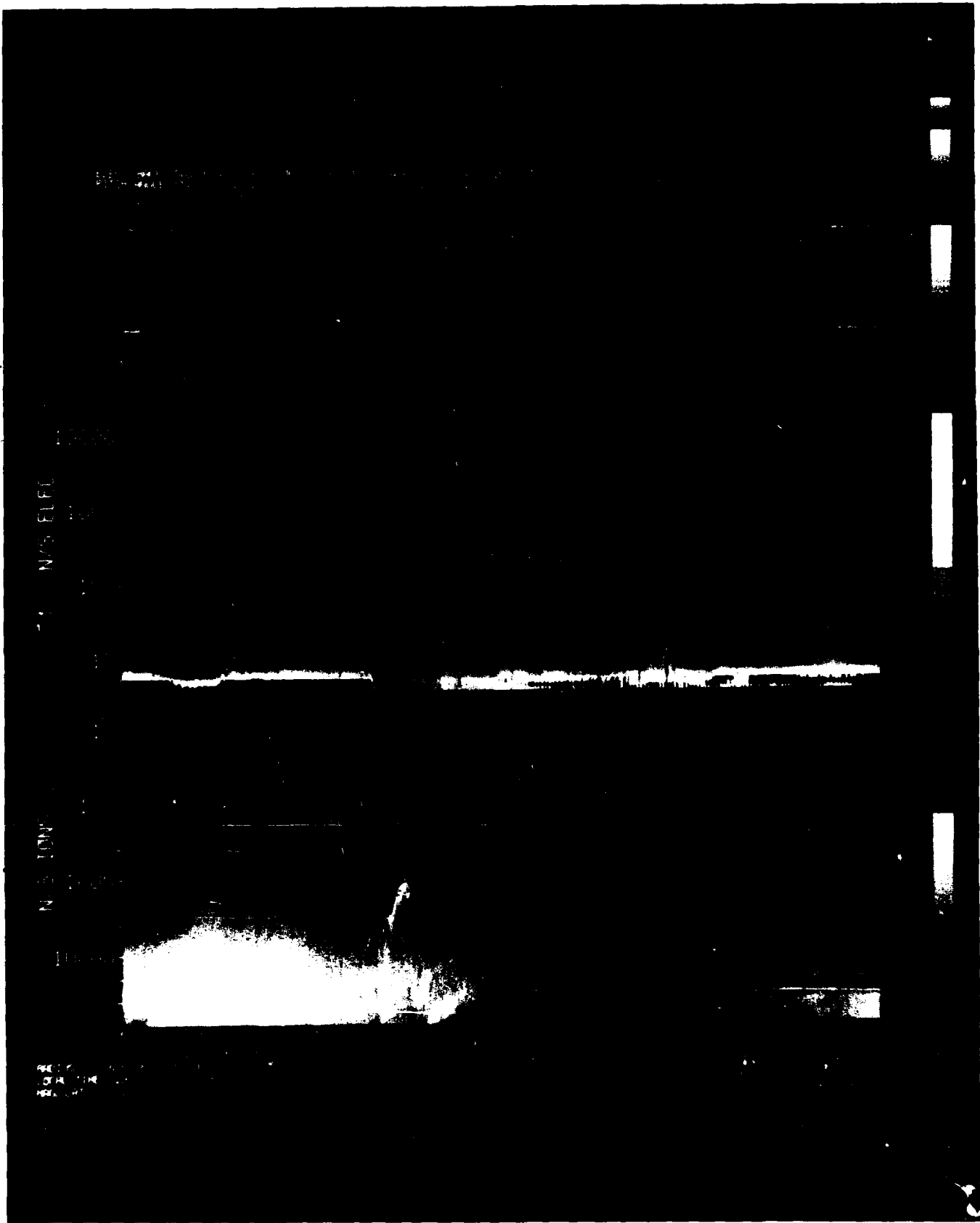












AD-A214 285

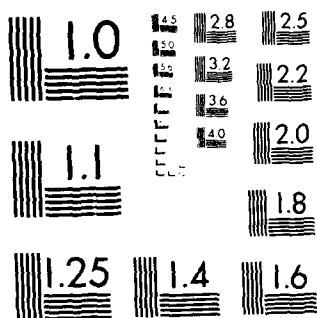
SCOTHA (SPACECRAFT CHARGING AT HIGH ALTITUDES) ATLAS
DATA BASE DOCUMENT 2 (U) GEOPHYSICS LAB (AFSC) HANSCOM AFB
NR E G MULLEN ET AL. 01 SEP 85 GL-TR-85-0249(2)

2/3

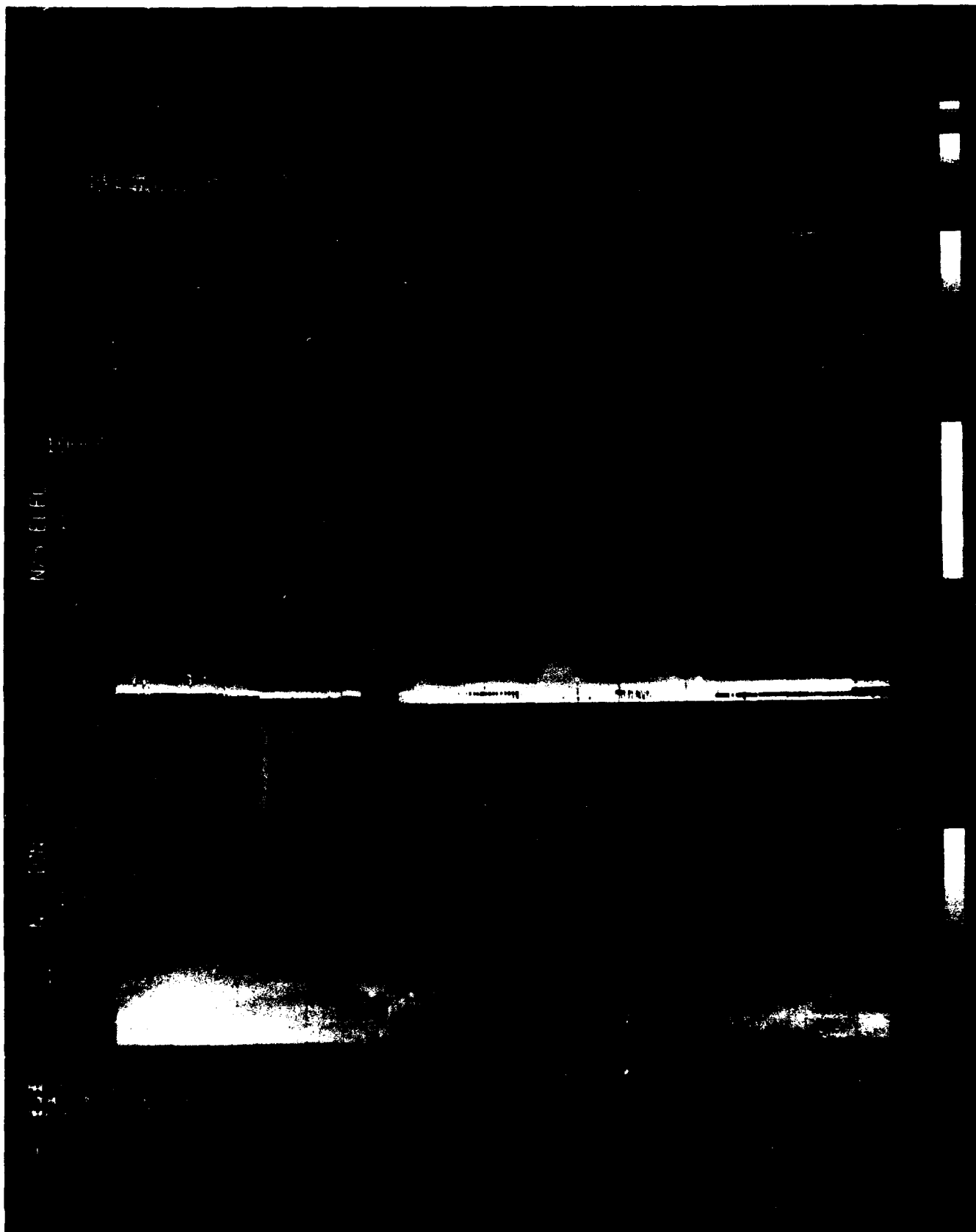
UNCLASSIFIED

F/C 22/3

ML



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



RECEIVED 10/10/50

N/S ELECT

N/S IONS

423

N/S ELEC

1000-

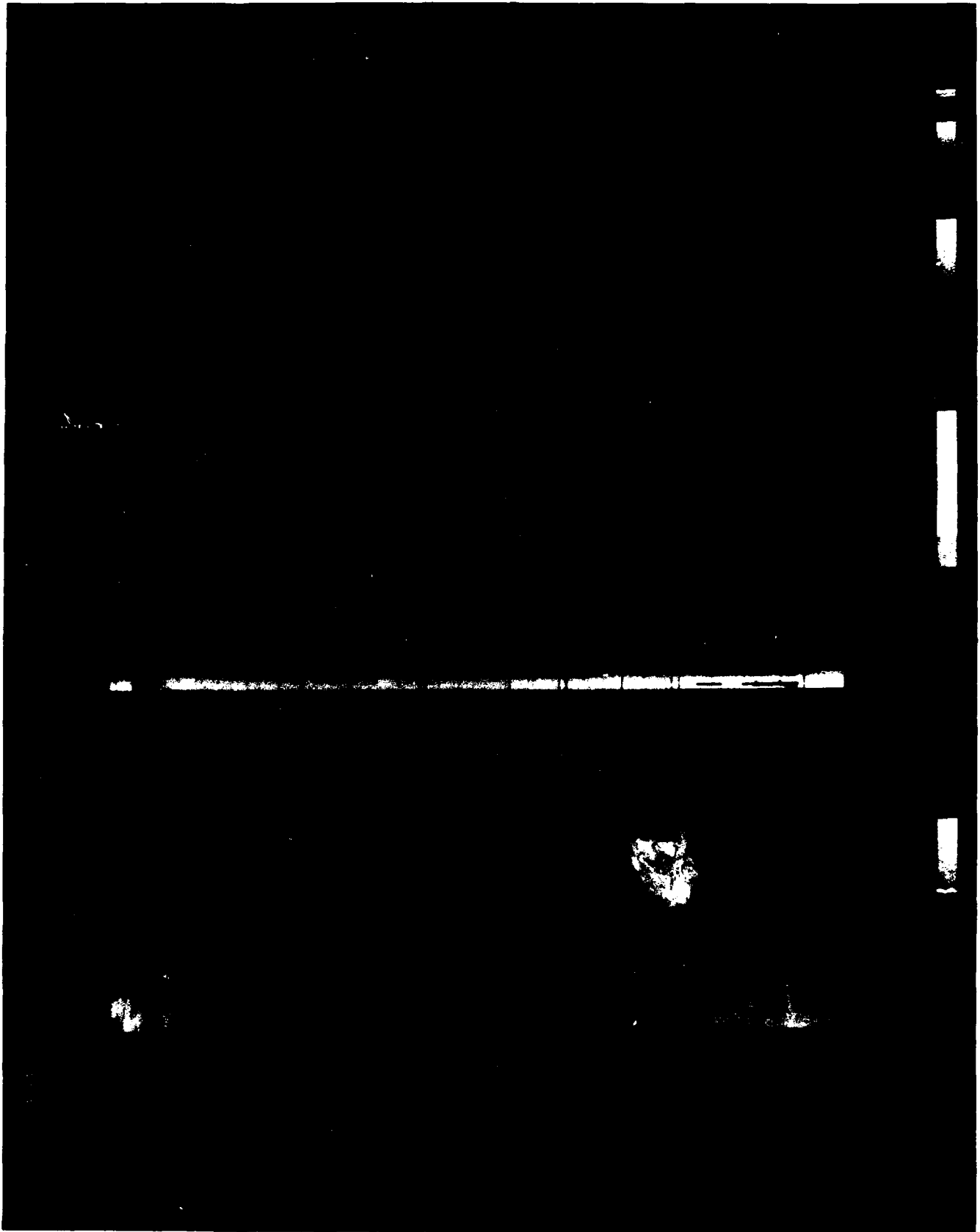
1000-

100-

N/S ELEC

1000-

100-



6. MIDDLE ENERGY ION COMPOSITION DATA BASE, SC8

6.1 Instrument Description

The Lockheed Energetic Ion Composition Experiment, built and operated under the direction of R.G. Johnson, measures ions with energies per unit charge (keV/q) from $100\text{ eV}/q$ to $32\text{ keV}/q$ in 24 logarithmically-spaced energy steps and with masses 1 to 160 AMU. The instrument consists of three ion mass spectrometer heads (CXAs), each consisting of a Wien velocity filter in series with an electrostatic analyzer and a channel electron multiplier sensor. Each detector measures in eight energy-per-unit charge steps and has a resolution of 5° FWHM. The instrument operates in two modes. One mode (sweep mode) sweeps in mass per unit charge, acquiring a full mass (32 point) and energy (24 point) spectrum every 16 s. The other mode (locked mode) samples one particular mass and obtains a complete (24 point) energy spectrum every $1/2$ s. In normal operation the detectors alternate between a sweep and a lock mode every 64 s. Background samples are periodically taken over the whole mass range. A complete description of the instrument is given in Kaye, et al. ⁷

The data base used in the SCATHA Atlas are 1-h averages of differential energy flux for mass 1 (H^+) and mass 16 (O^+) in each of 24 different energy steps. The fluxes were provided on magnetic tape by Dr. R.G. Johnson of Lockheed, in units of $keV\text{ (cm}^2\text{ s sr keV)}^{-1}$. The data include both negative and positive values due to background subtractions, and the negative values were included in the statistical calculations. No pitch angle discrimination was made in the data set, and a 1-h average consists of the total data available in that 1-h time span.

6.2 Description of Data Presentation: SC8 Low Energy Plasma

In each Figure H^+ and O^+ differential energy flux is plotted for 24 different energies as a function of Universal Time (UT) for a 24-hour period. The points represent 1-hr averages of the data. The oxygen fluxes (O^+) are plotted with +’s and the hydrogen fluxes (H^+) are plotted with X’s. Missing data points indicate values are below the lower plotting limits.

⁷Kaye, S.M., Johnson, R.G., Sharp, R.D., and Shelley, E.G. (1981) Observations of transient H^+ and O^+ bursts in the equatorial magnetosphere, *J. Geophys. Res.*, 86:1335.

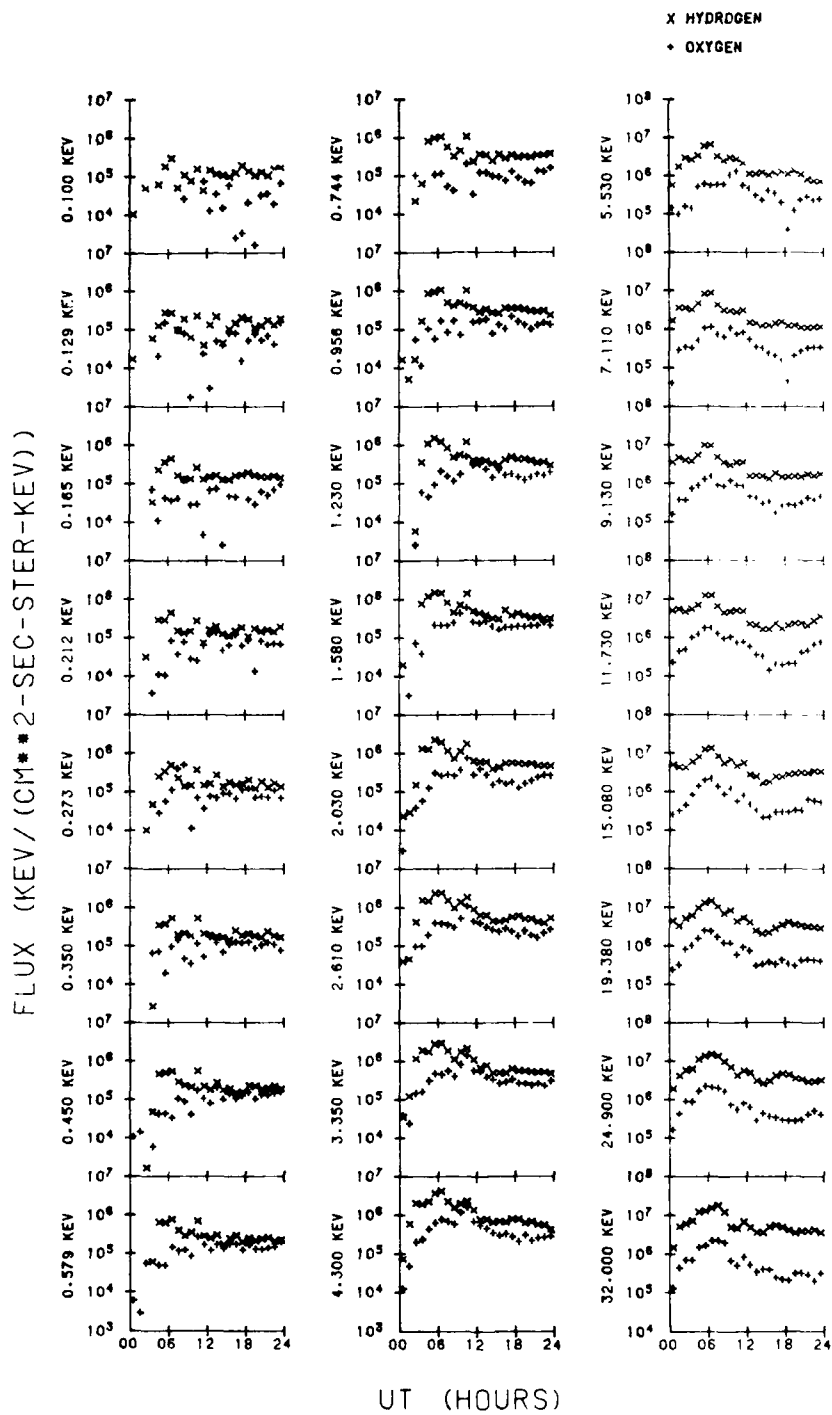
6.3 Calendar of Days for which SC3 Ion Composition Data are Presented

1979

| DAY | FEB | MAR | APR | MAY | JUN | JUL | AUG | DAY |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | | | | | 152 | | | 1 |
| 2 | | | | 122 | | | | 2 |
| 3 | | | 093 | 123 | | | | 3 |
| 4 | | | 094 | 124 | | | 216 | 4 |
| 5 | | | 095 | 125 | 156 | | | 5 |
| 6 | | | | 126 | 157 | | 218 | 6 |
| 7 | | | | | 158 | 188 | | 7 |
| 8 | | | | 128 | | | | 8 |
| 9 | | | | 129 | | | | 9 |
| 10 | | | | | | | | 10 |
| 11 | | | | | | | | 11 |
| 12 | 043 | | | | | | | 12 |
| 13 | 044 | | 103 | | 164 | 194 | 225 | 13 |
| 14 | 045 | | 104 | | | | 226 | 14 |
| 15 | 046 | | | | | | 227 | 15 |
| 16 | 047 | | | | 167 | | | 16 |
| 17 | | | | | 168 | | | 17 |
| 18 | | 077 | 108 | 138 | | | 230 | 18 |
| 19 | | | | | | 200 | | 19 |
| 20 | | | 110 | | | | 232 | 20 |
| 21 | 052 | 080 | 111 | 141 | | | 233 | 21 |
| 22 | 053 | 081 | 112 | | | | 234 | 22 |
| 23 | | | 113 | | | | | 23 |
| 24 | | | 114 | | | | | 24 |
| 25 | | | 115 | 145 | | 206 | | 25 |
| 26 | | | 116 | 146 | | 207 | | 26 |
| 27 | | | 117 | | 178 | 208 | | 27 |
| 28 | 059 | 087 | 118 | | | | | 28 |
| 29 | | 088 | 119 | 149 | 180 | 210 | 241 | 29 |
| 30 | | 089 | 120 | 150 | | | | 30 |
| 31 | | | | | 212 | | | 31 |

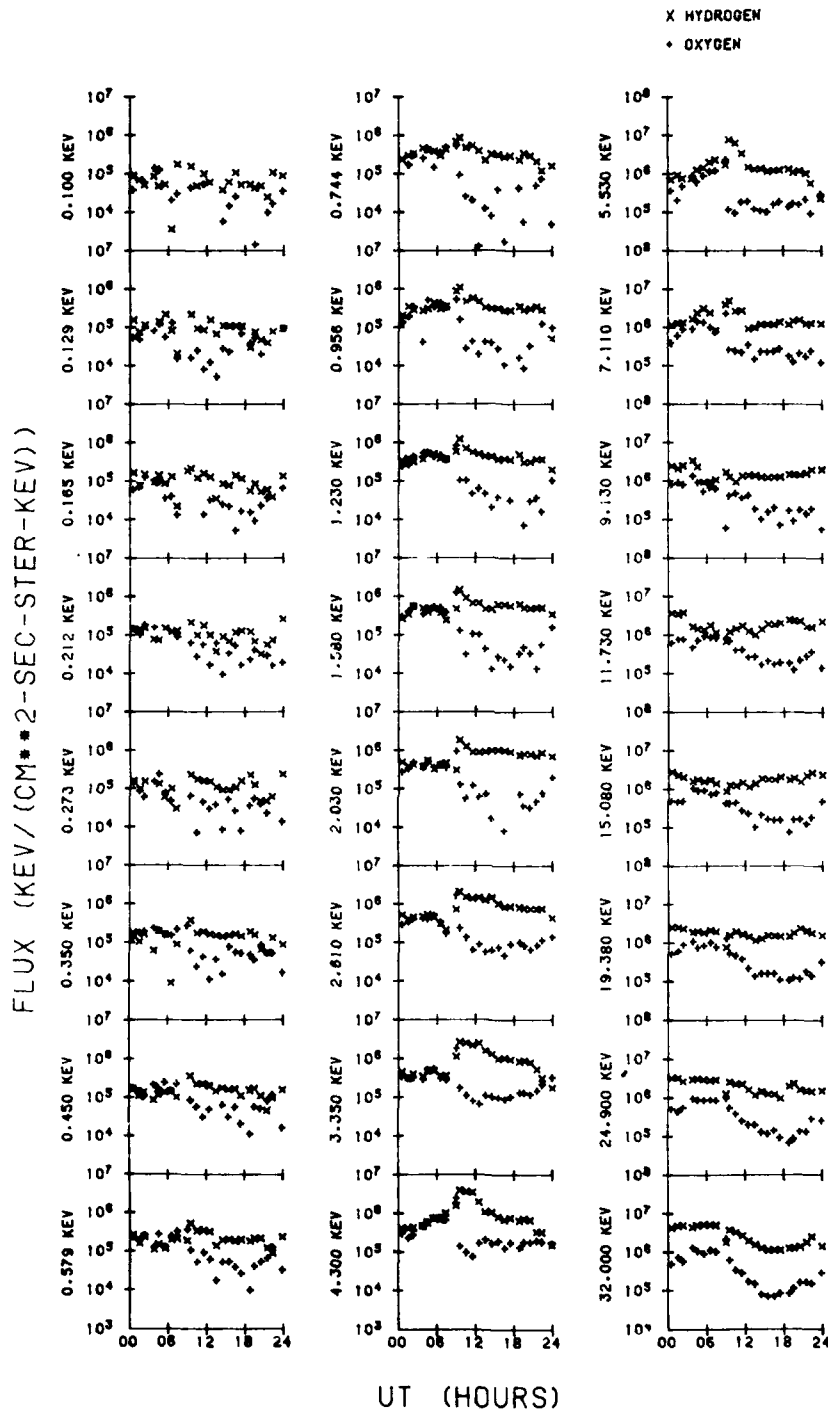
6.4 Data Presentation; SC3 Ion Composition Data

IONS



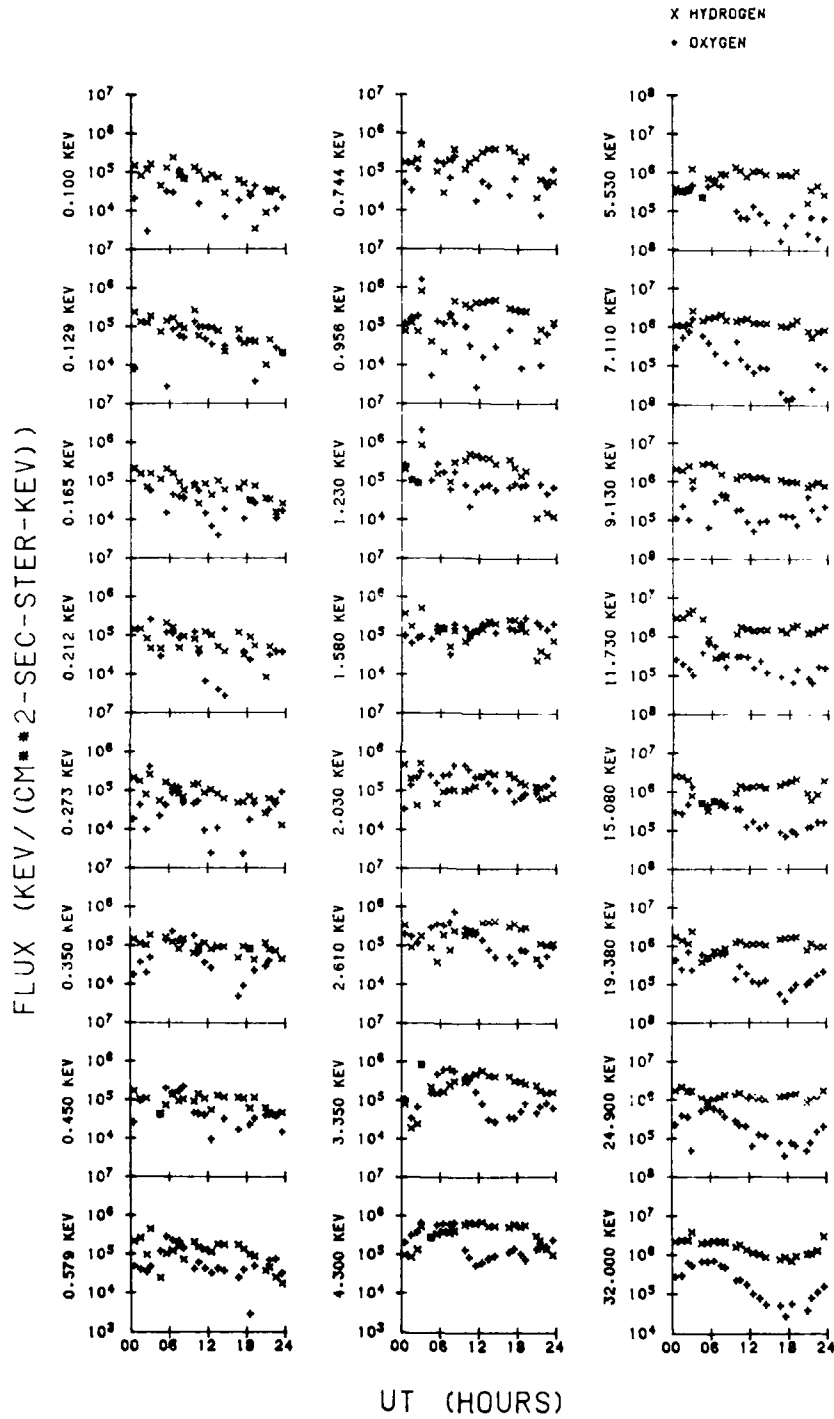
DAY 43

IONS

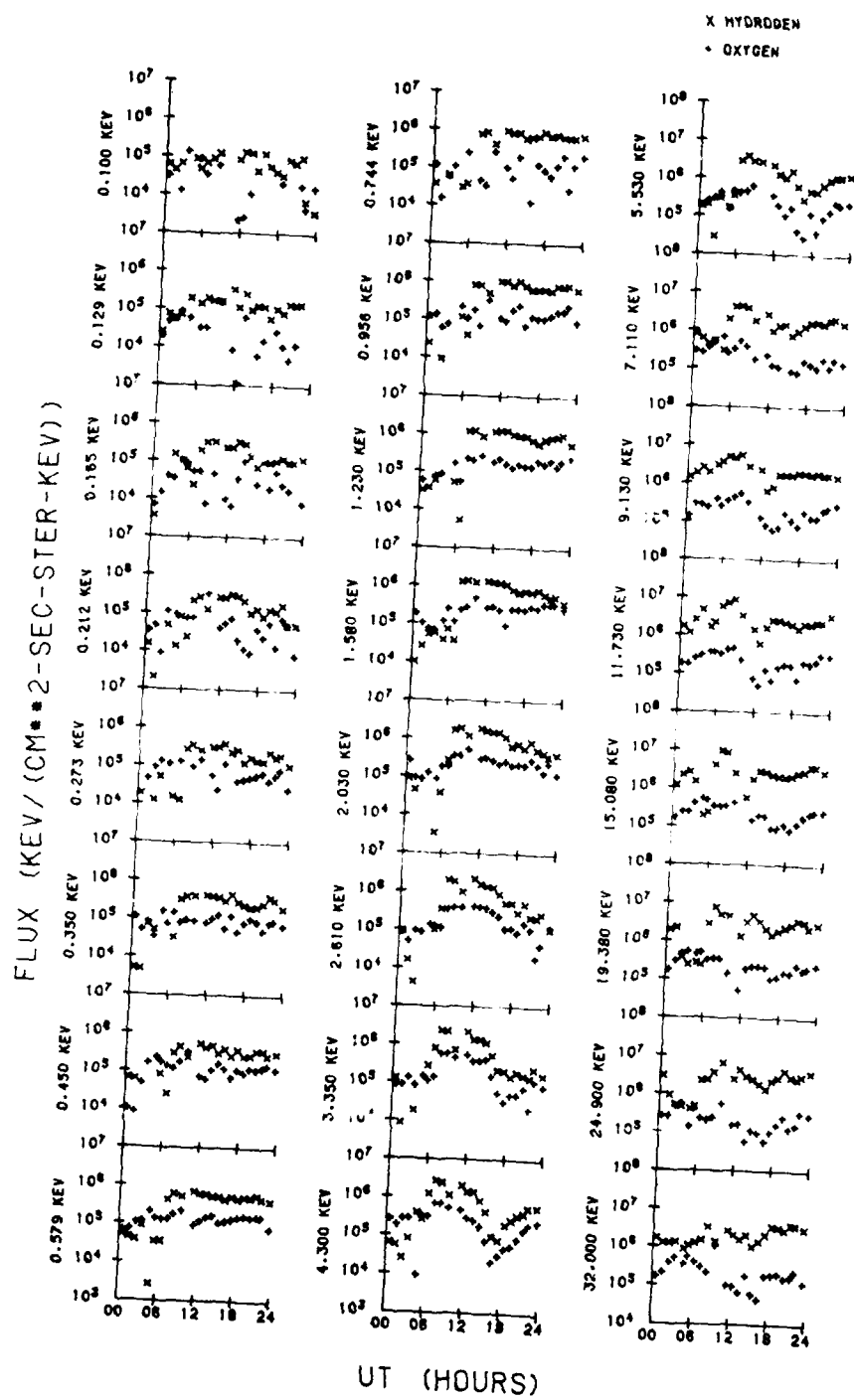


DAY 44

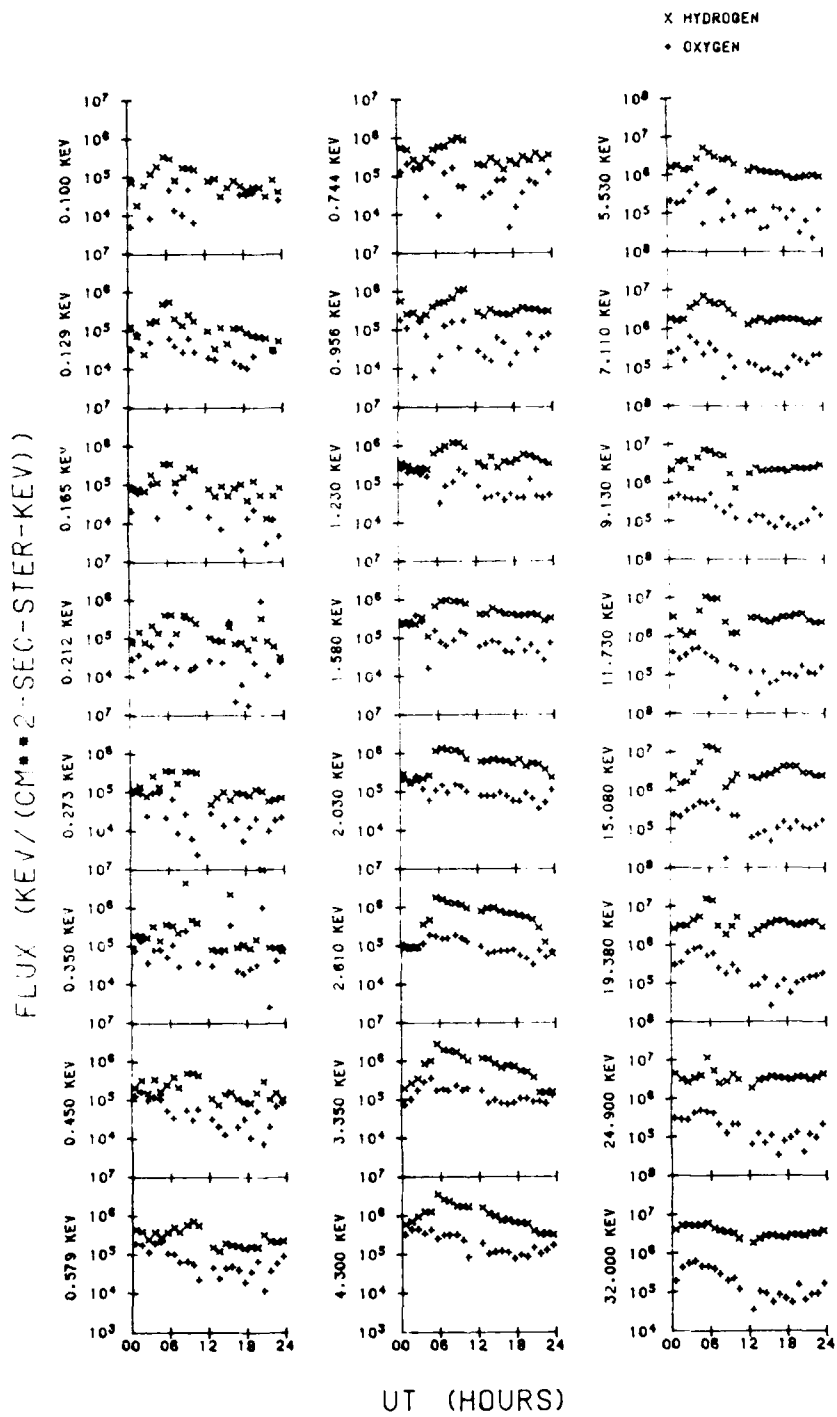
IONS



IONS

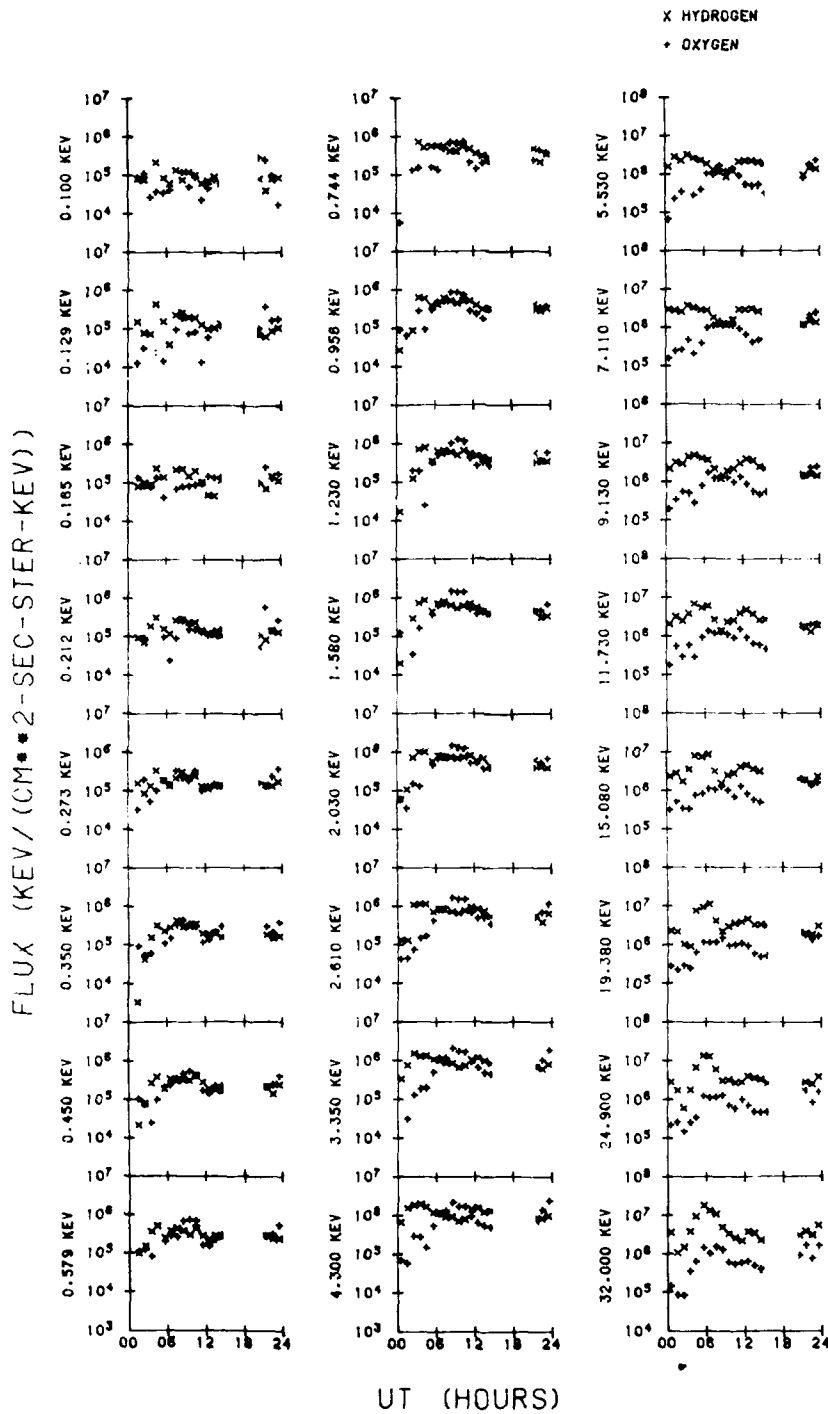


IONS

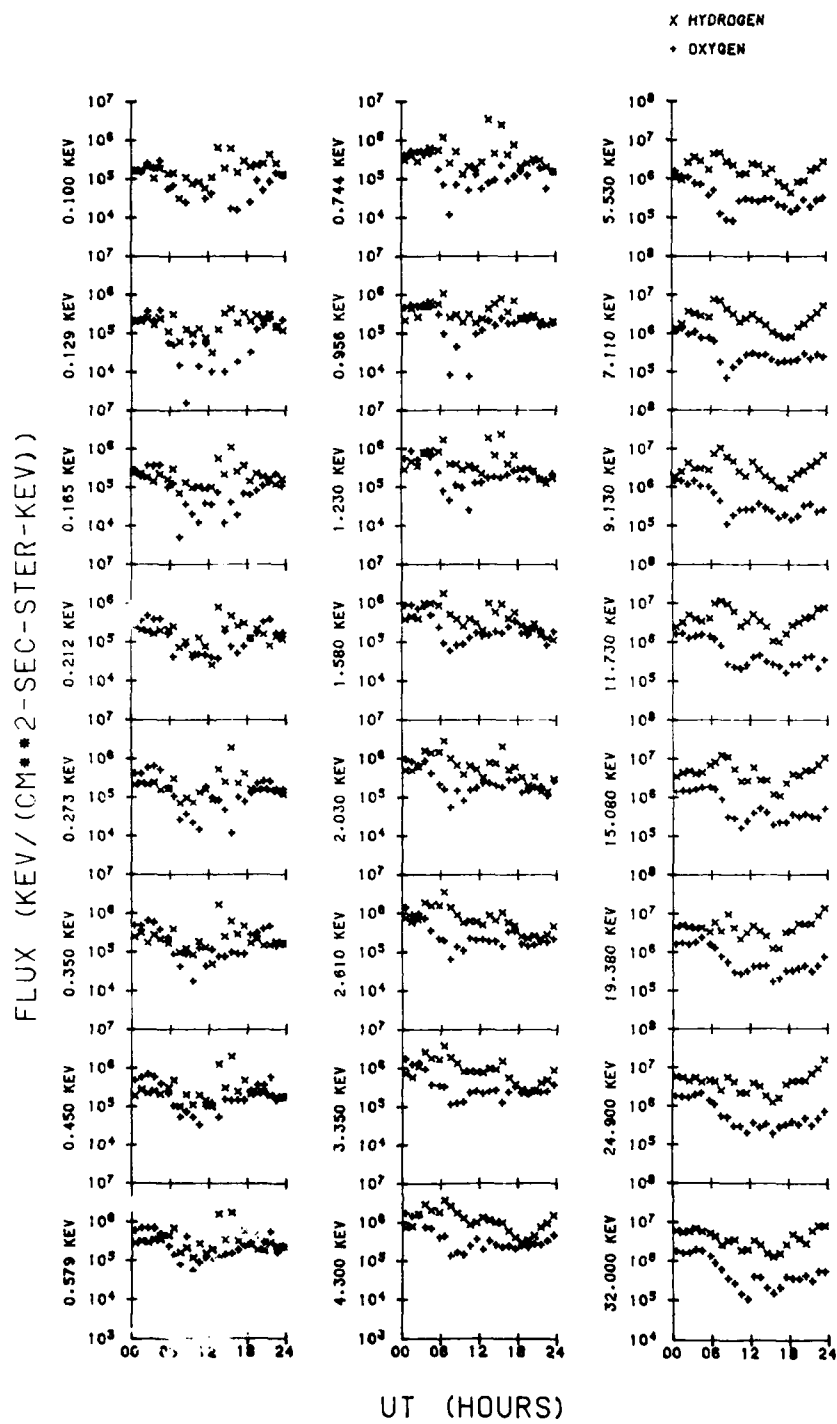


DAY 47

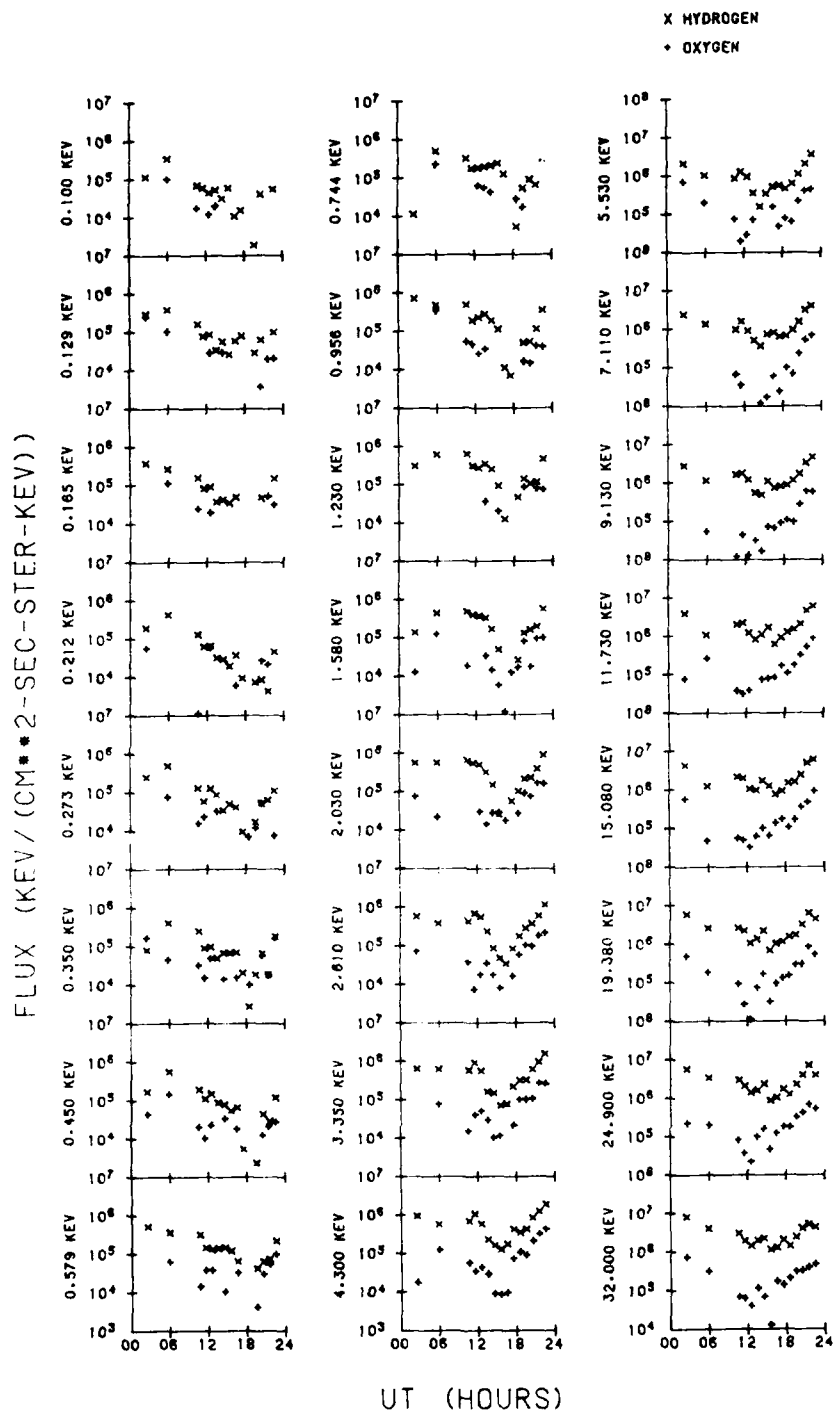
IONS



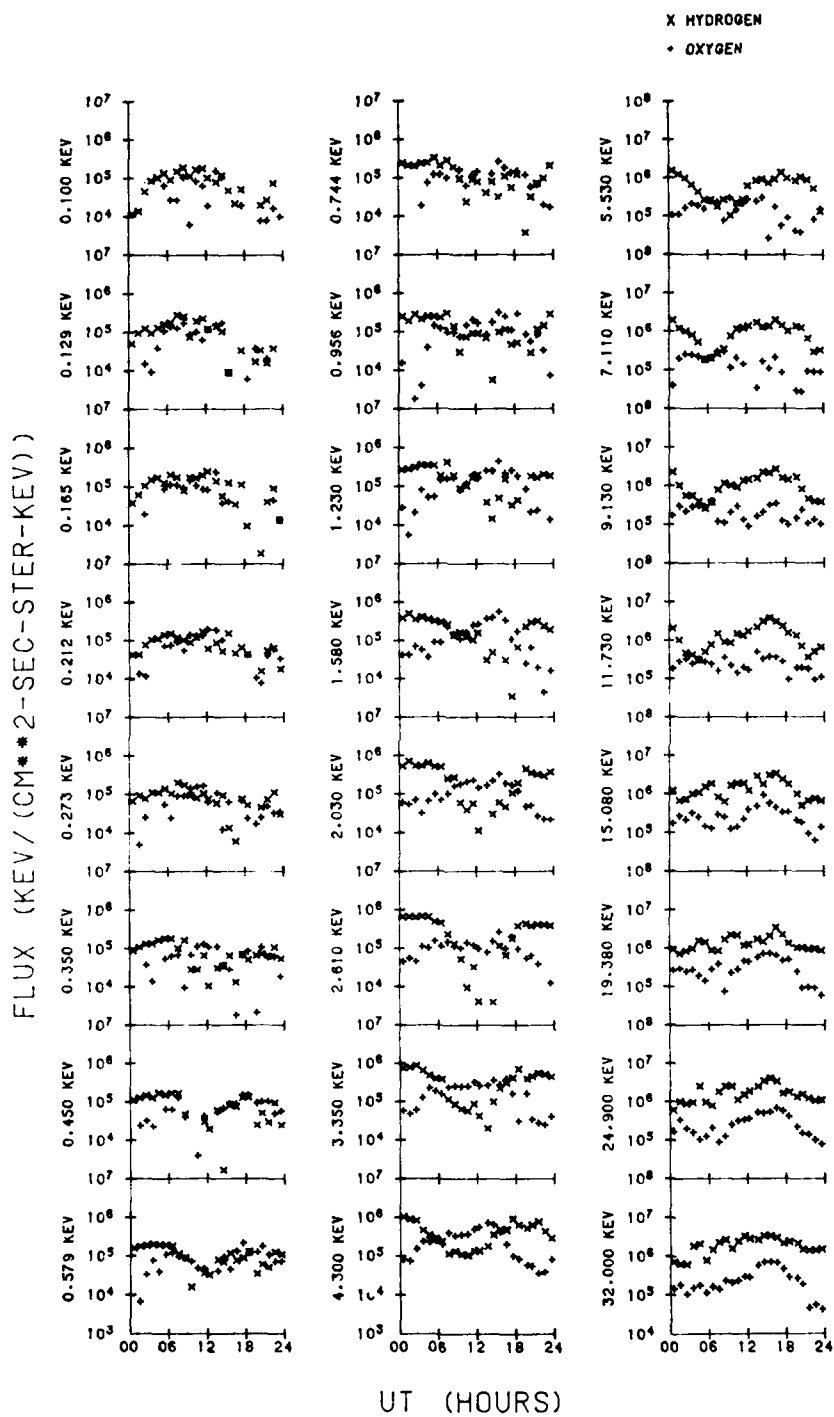
IONS



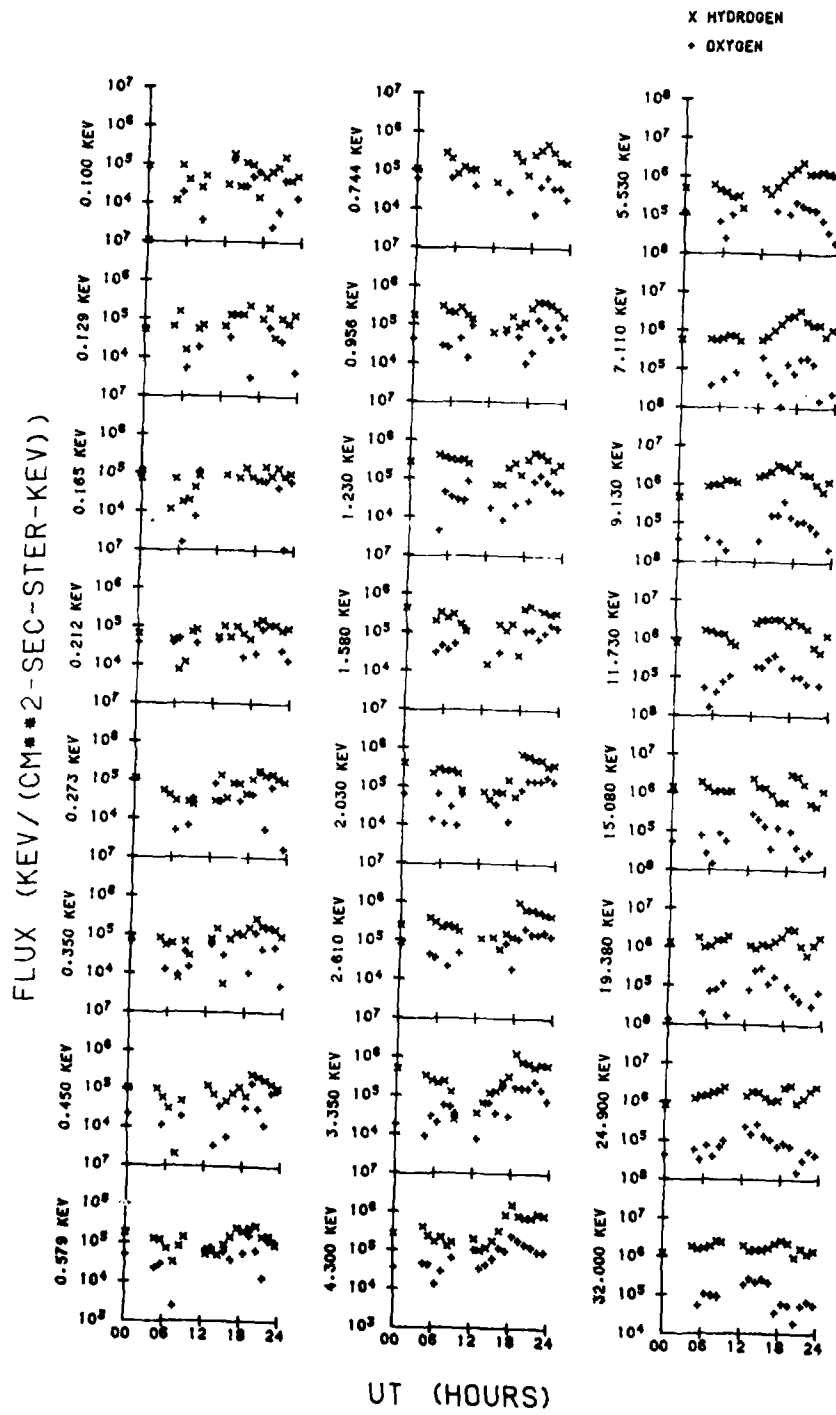
IONS



IONS

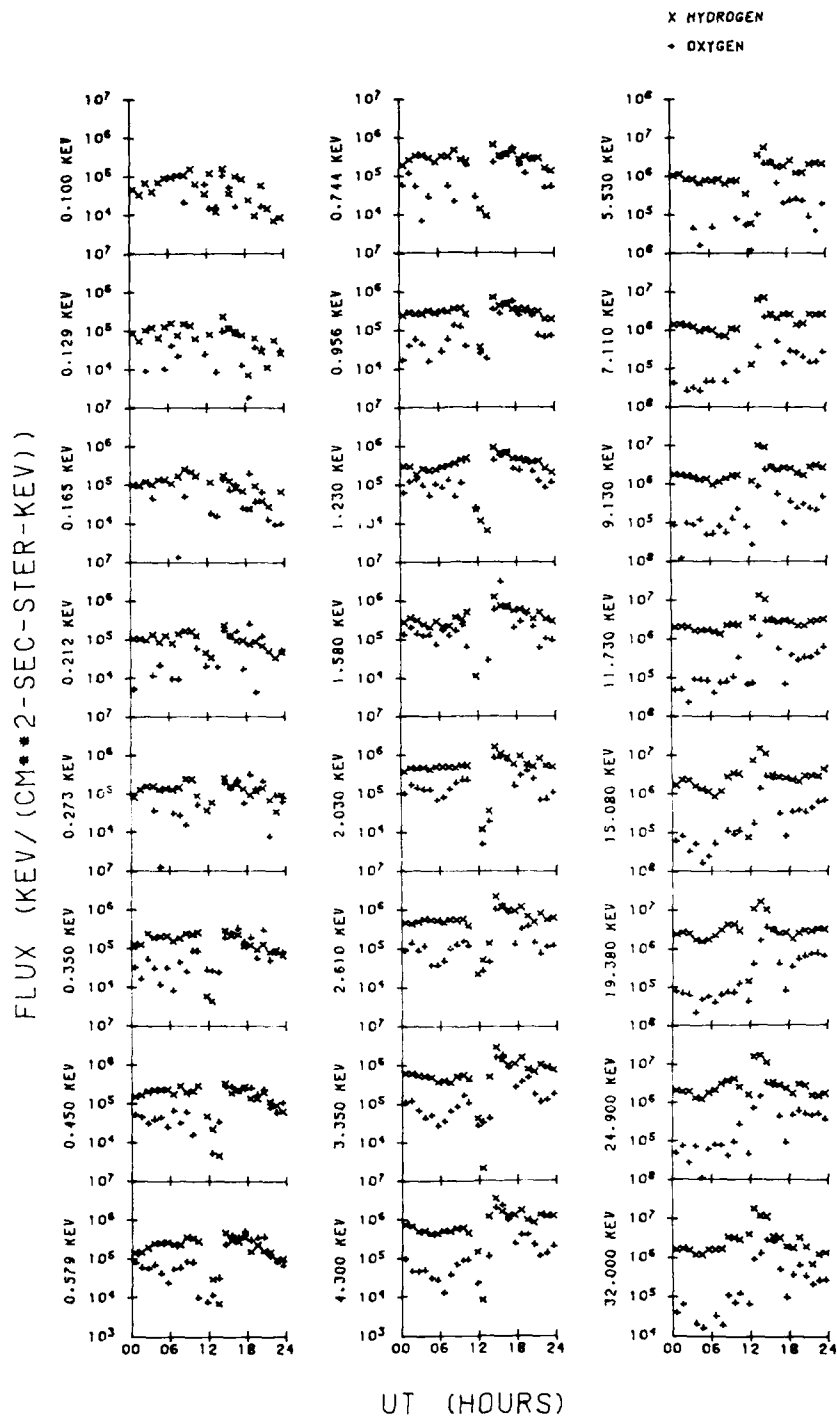


IONS



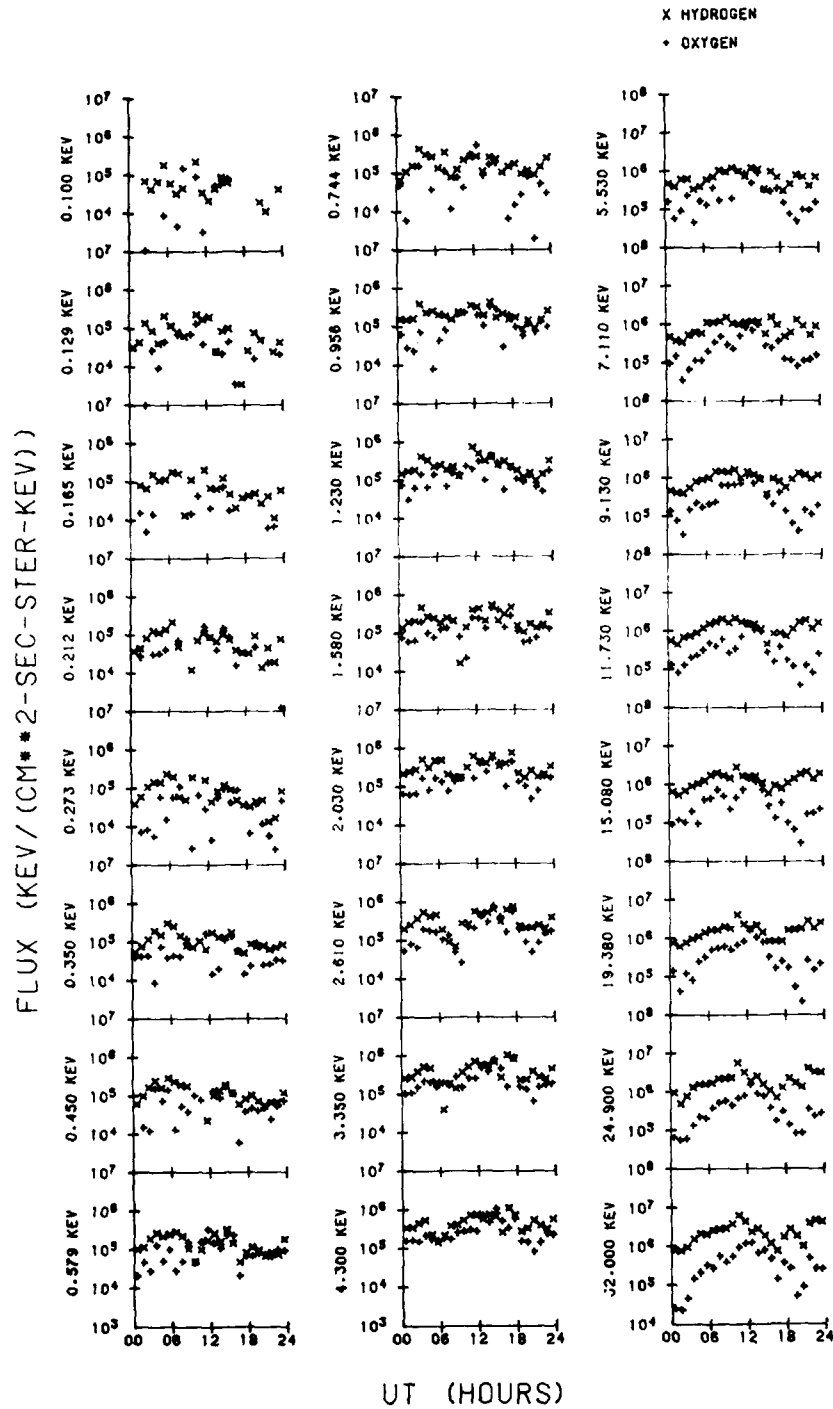
DAY 80

IONS



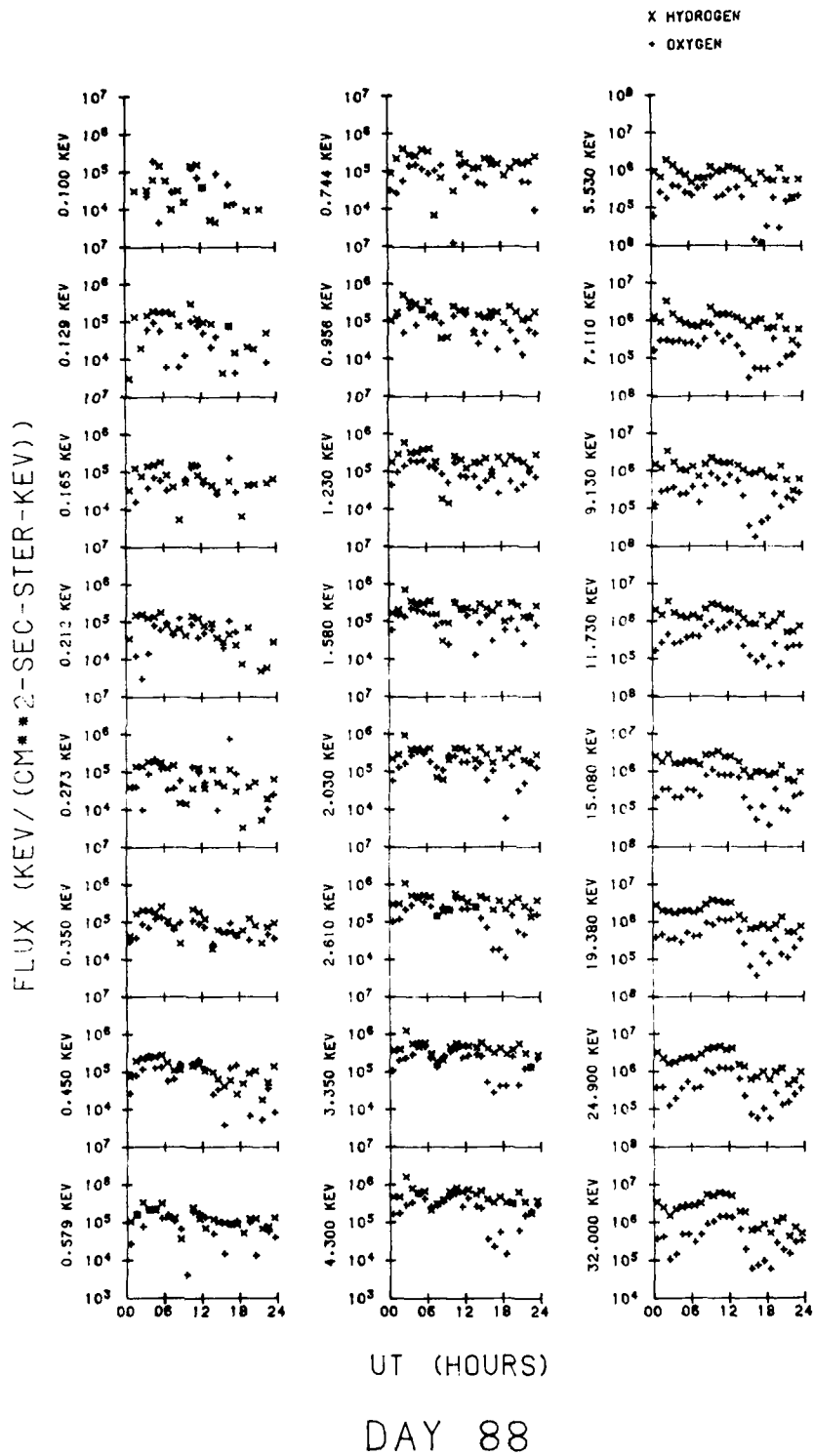
DAY 81

IONS

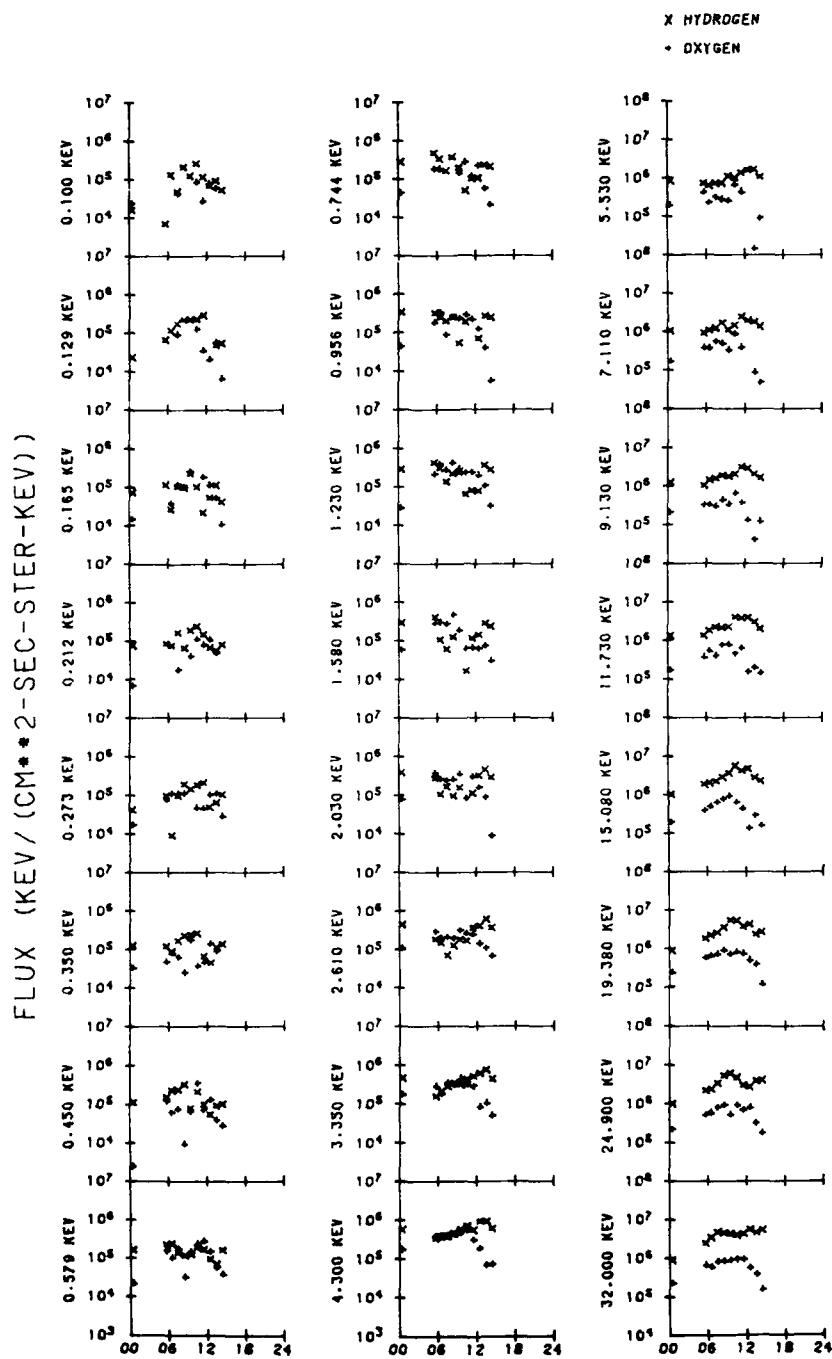


DAY 87

IONS



IONS

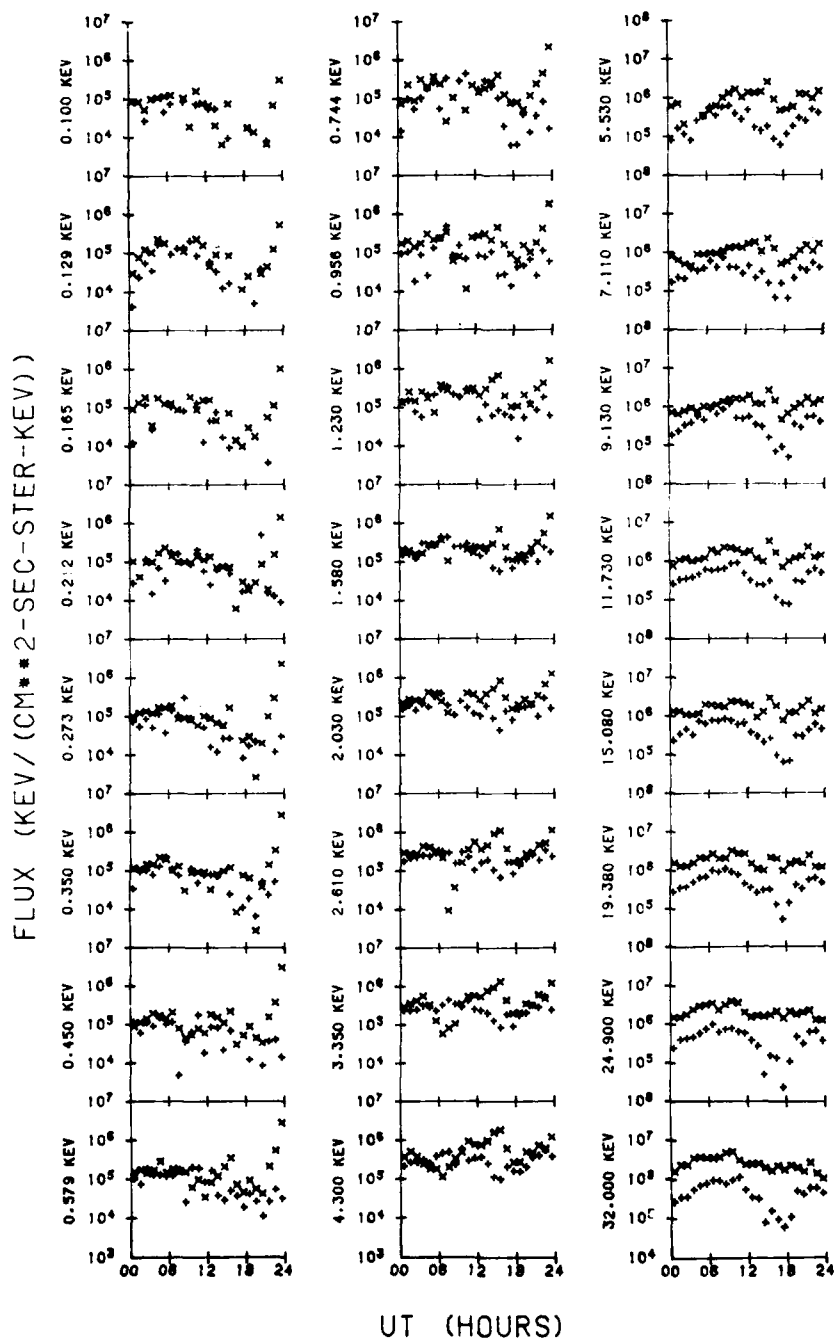


UT (HOURS)

DAY 89

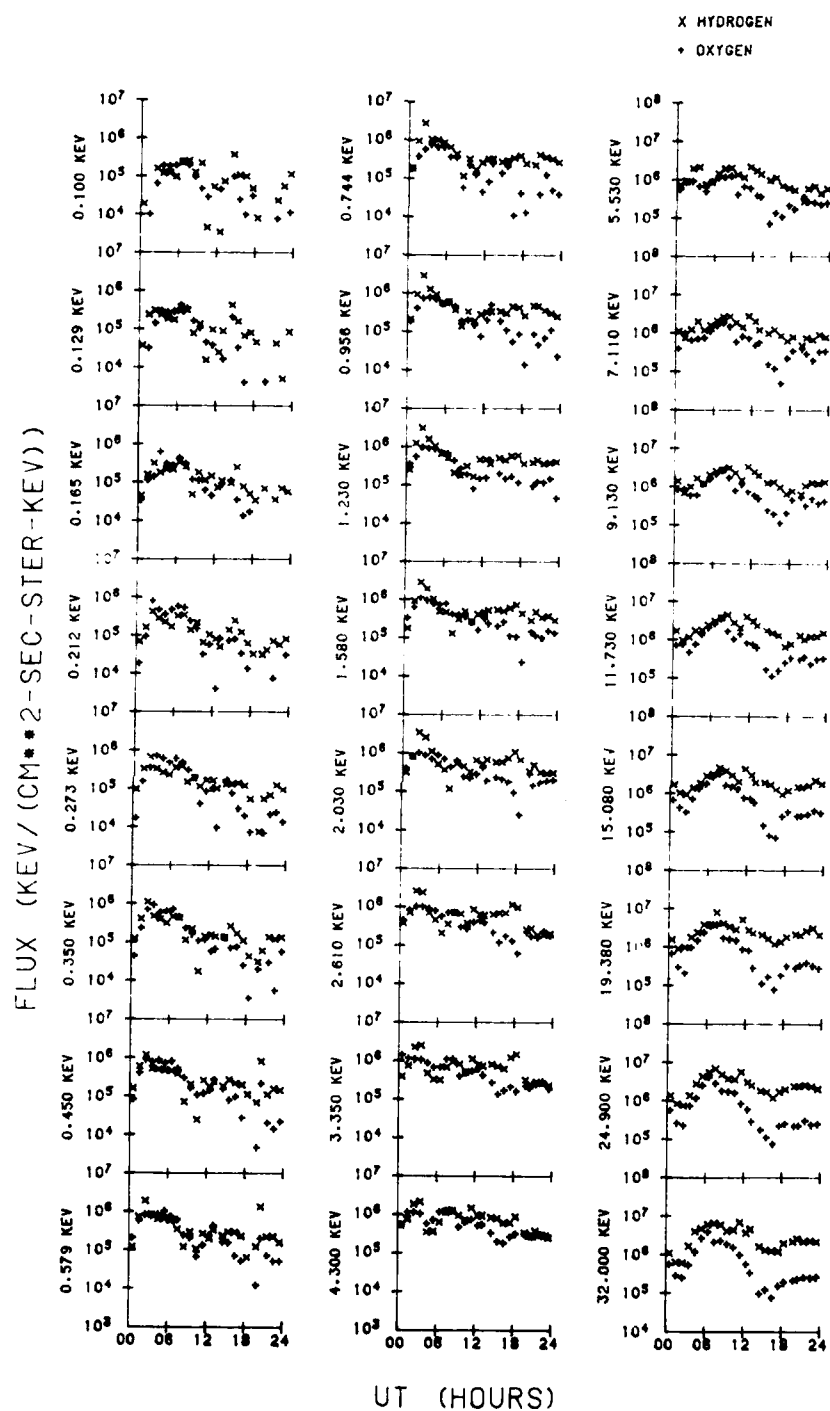
IONS

X HYDROGEN
+ OXYGEN



DAY 93

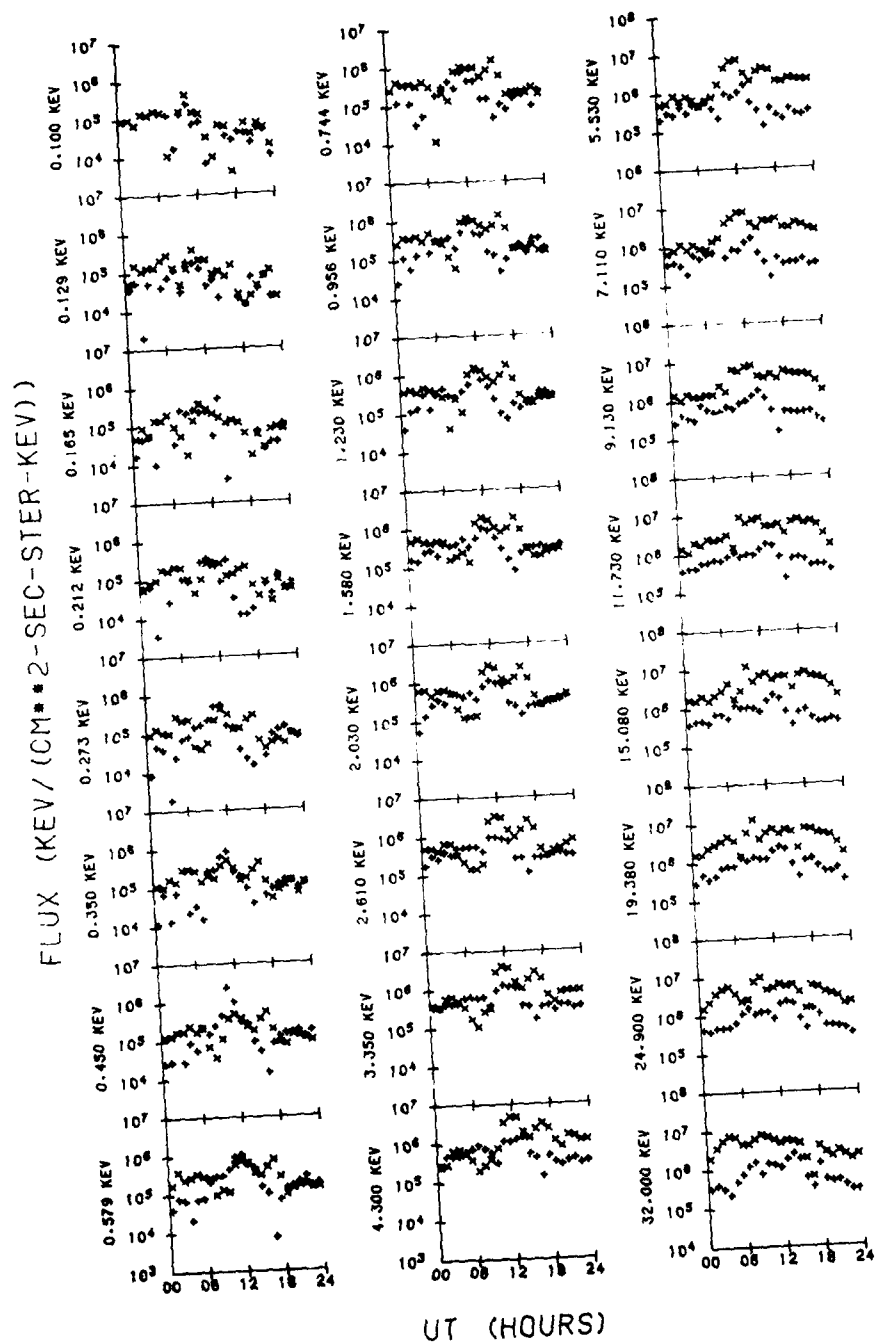
IONS



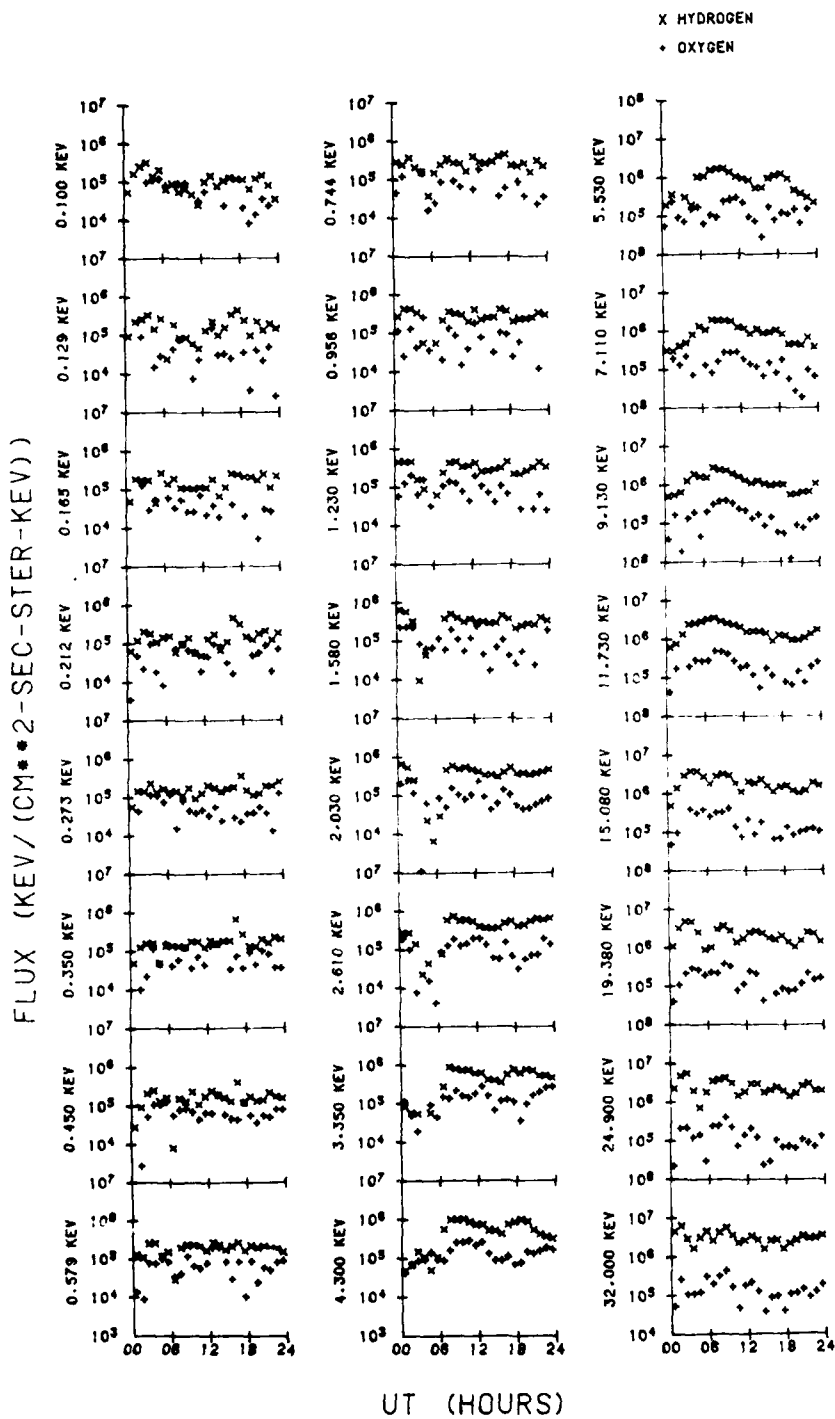
DAY 94

IONS

X HYDROGEN
+ OXYGEN

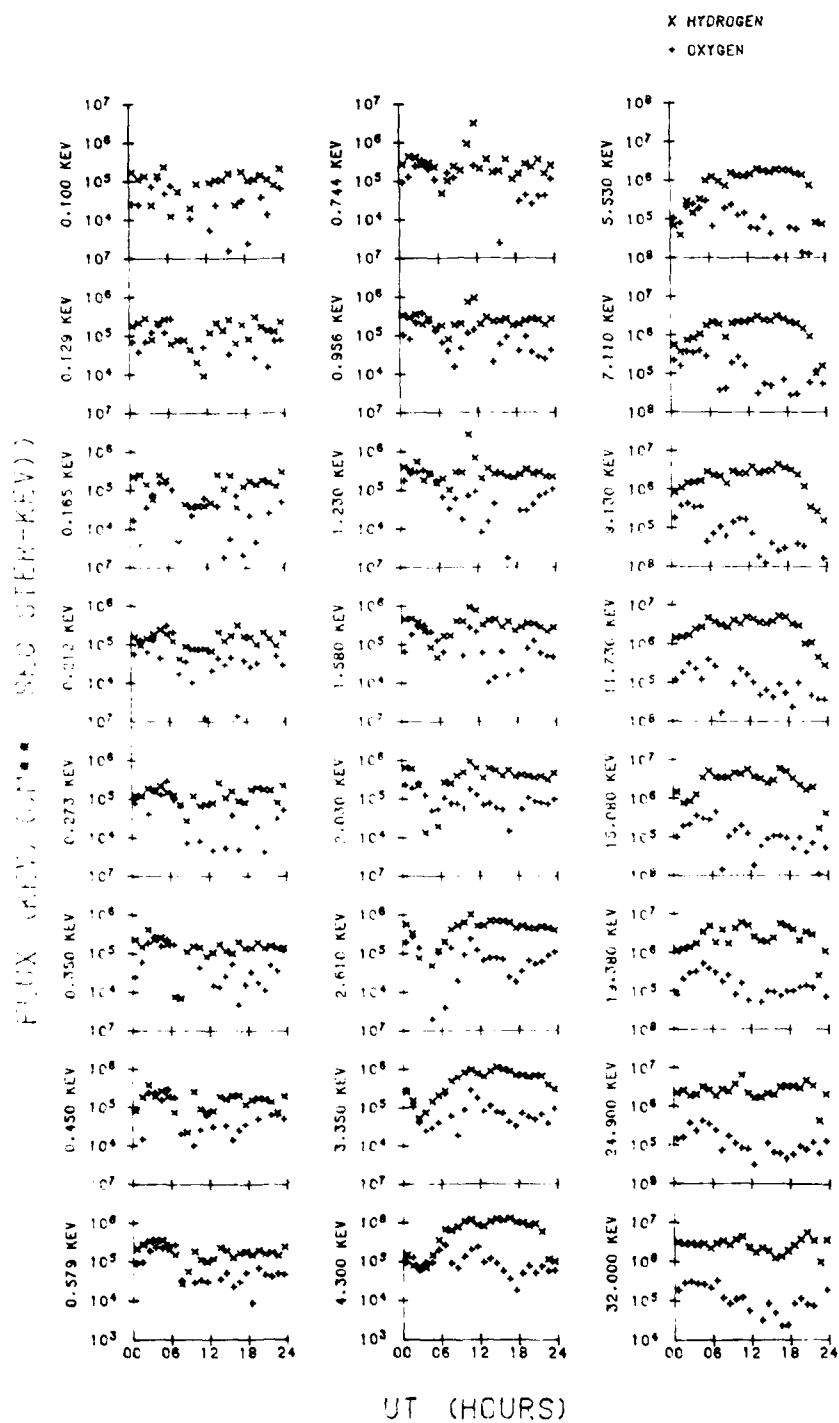


IONS

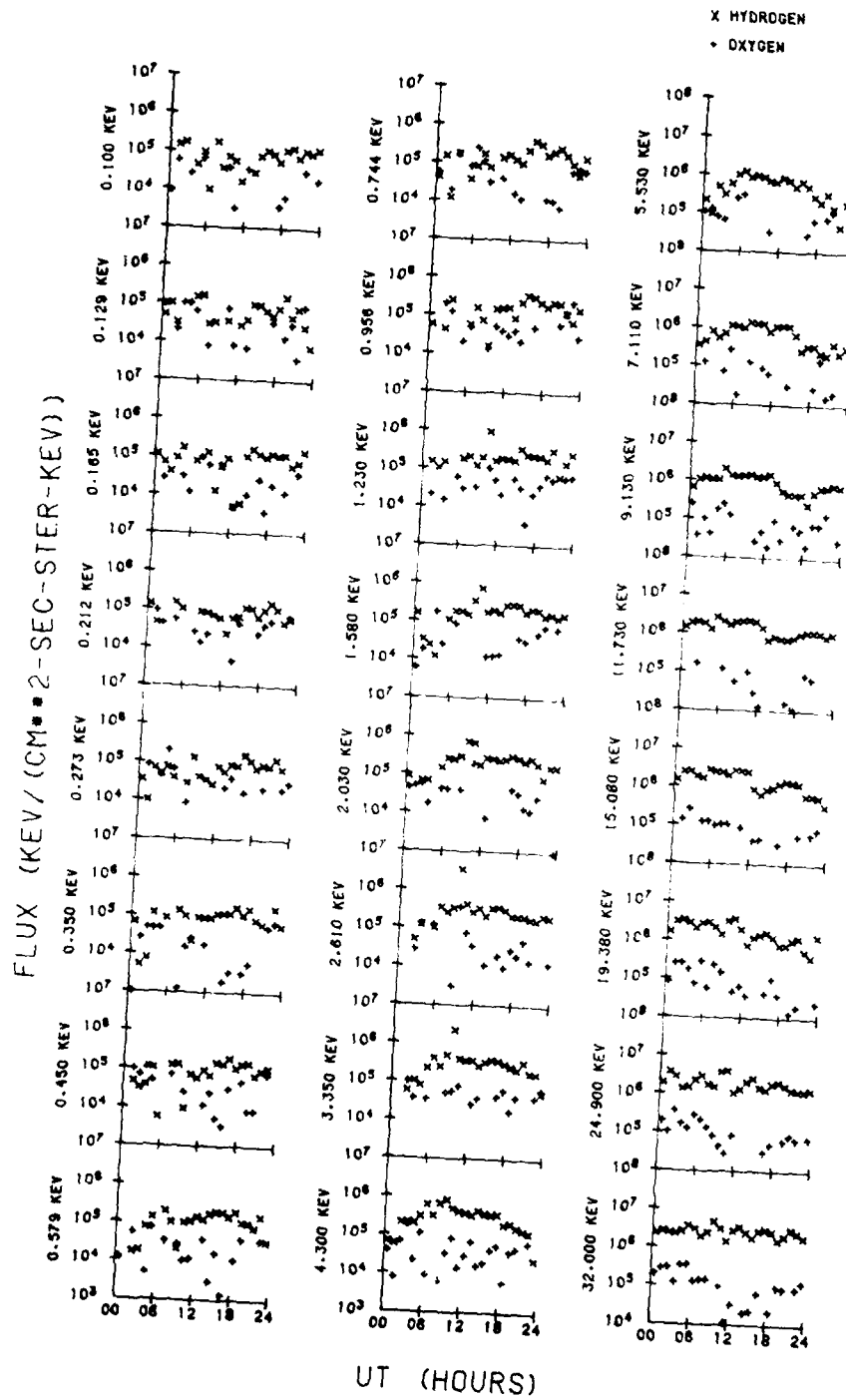


DAY 103

IONS



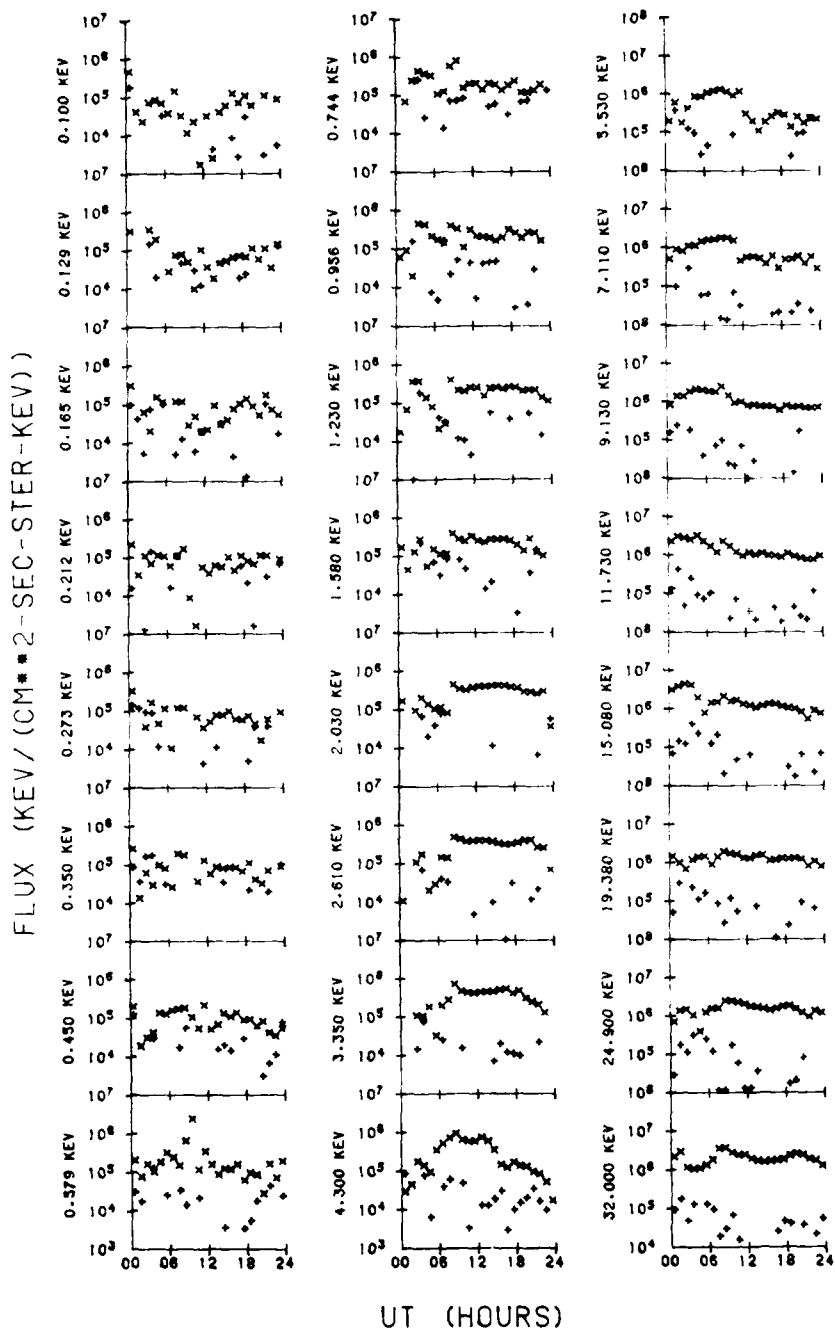
IONS



DAY 108

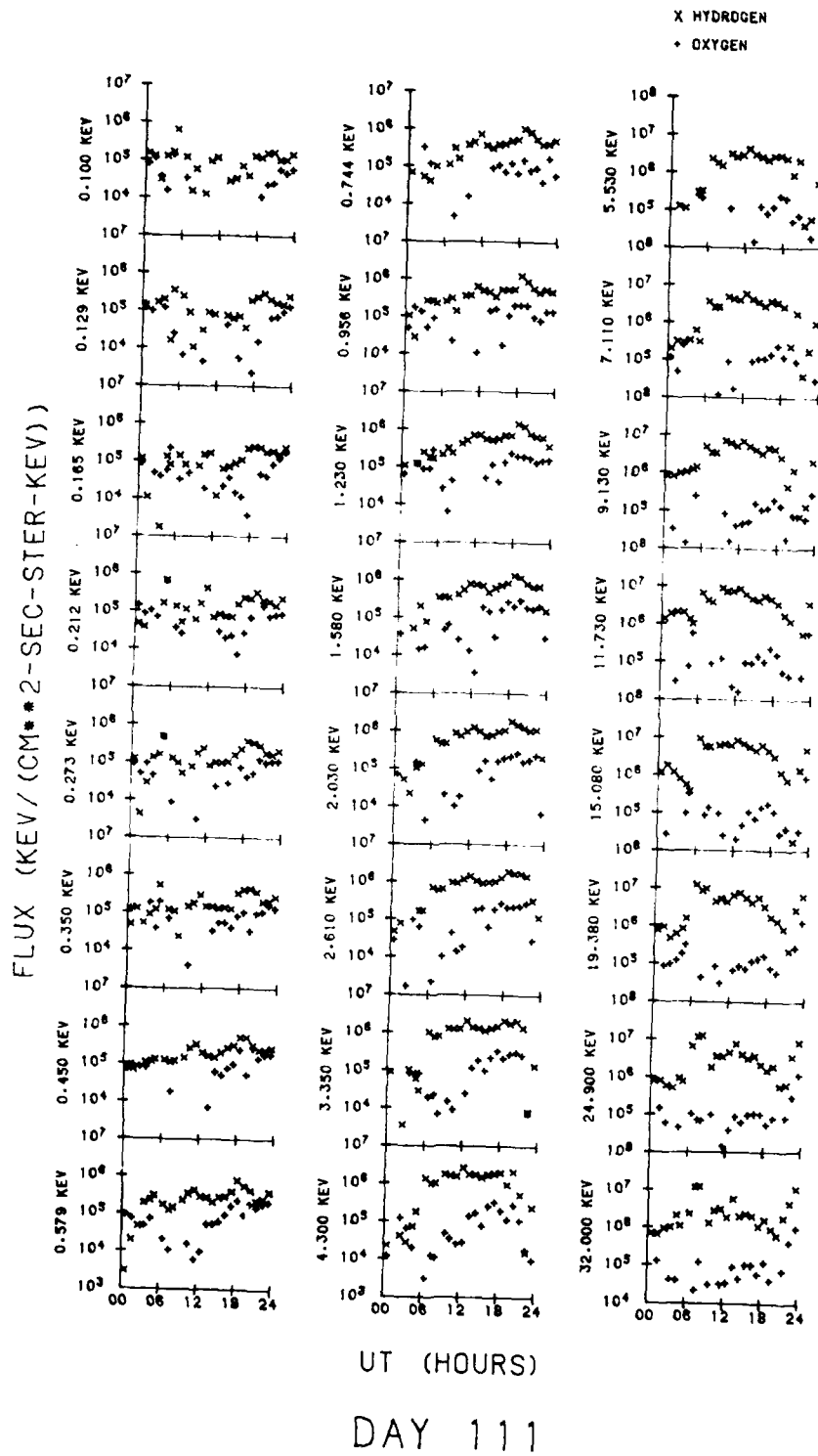
IONS

X HYDROGEN
+ OXYGEN

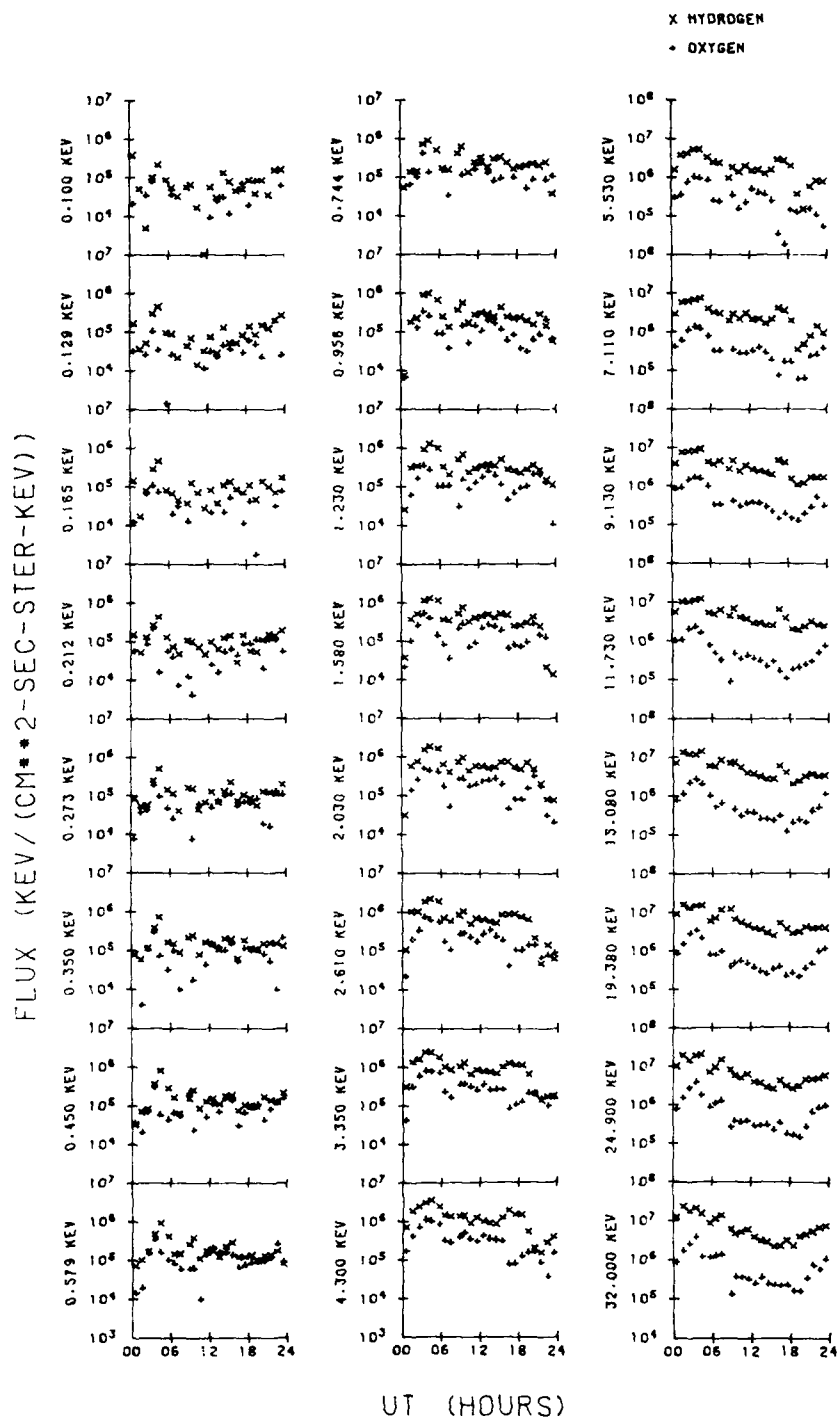


DAY 110

IONS

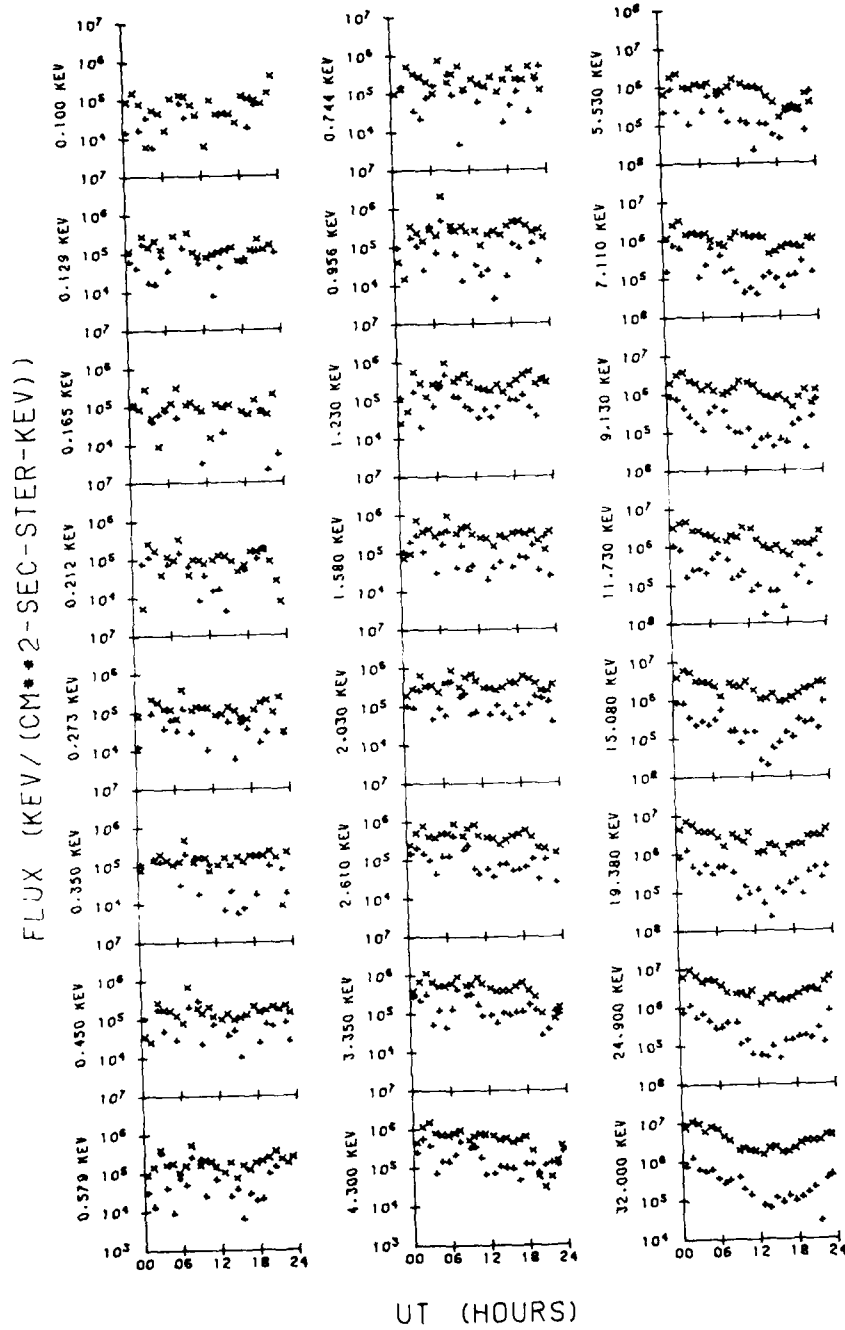


IONS



IONS

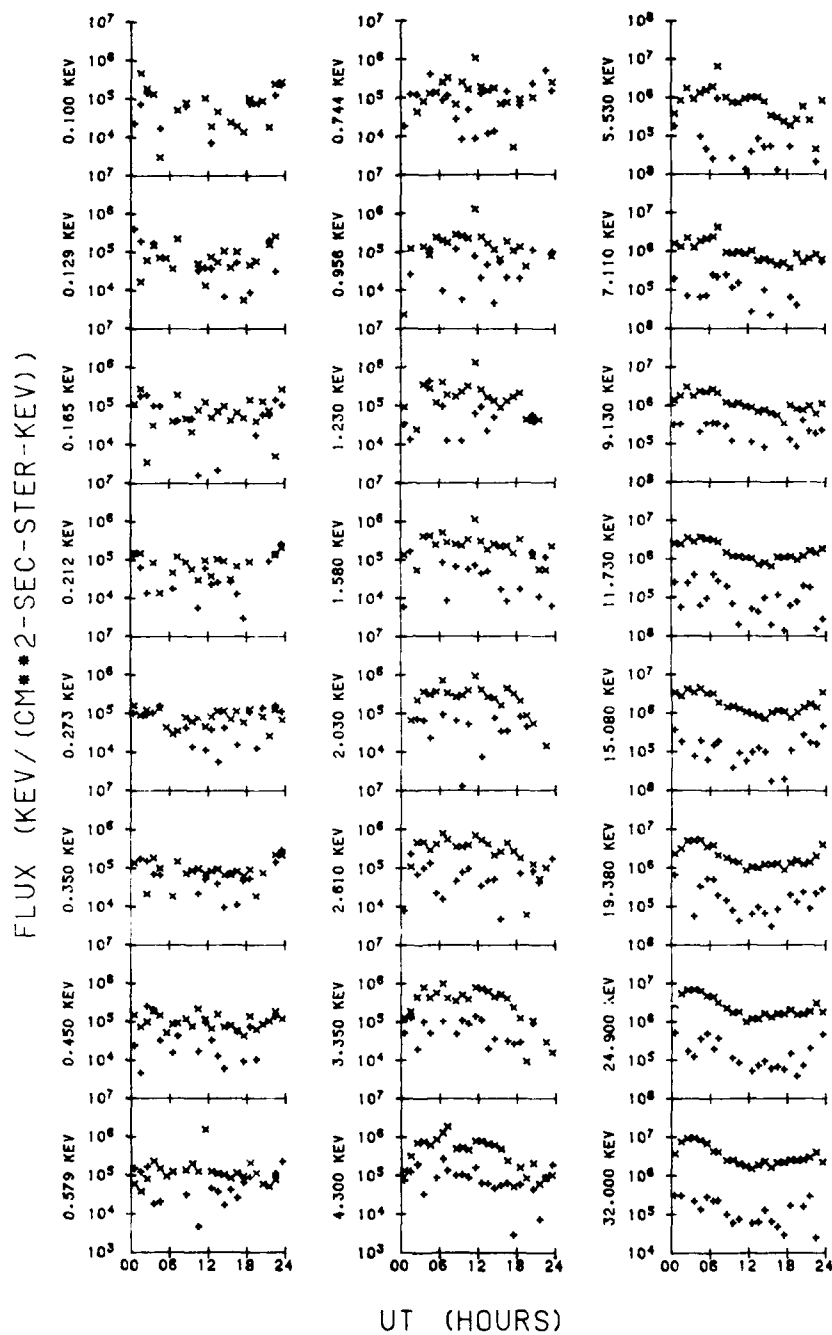
X HYDROGEN
+ OXYGEN



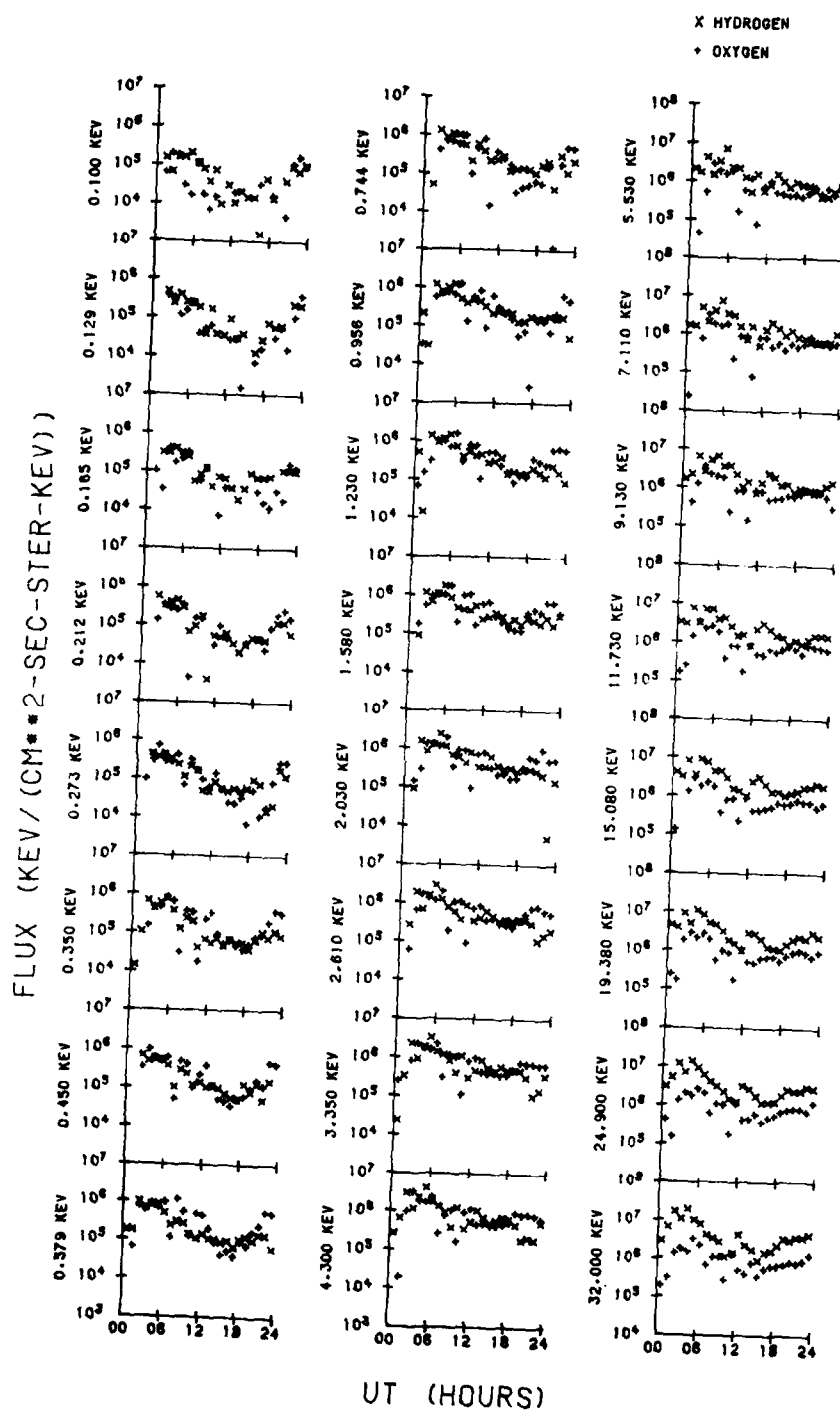
DAY 113

IONS

X HYDROGEN
+ OXYGEN

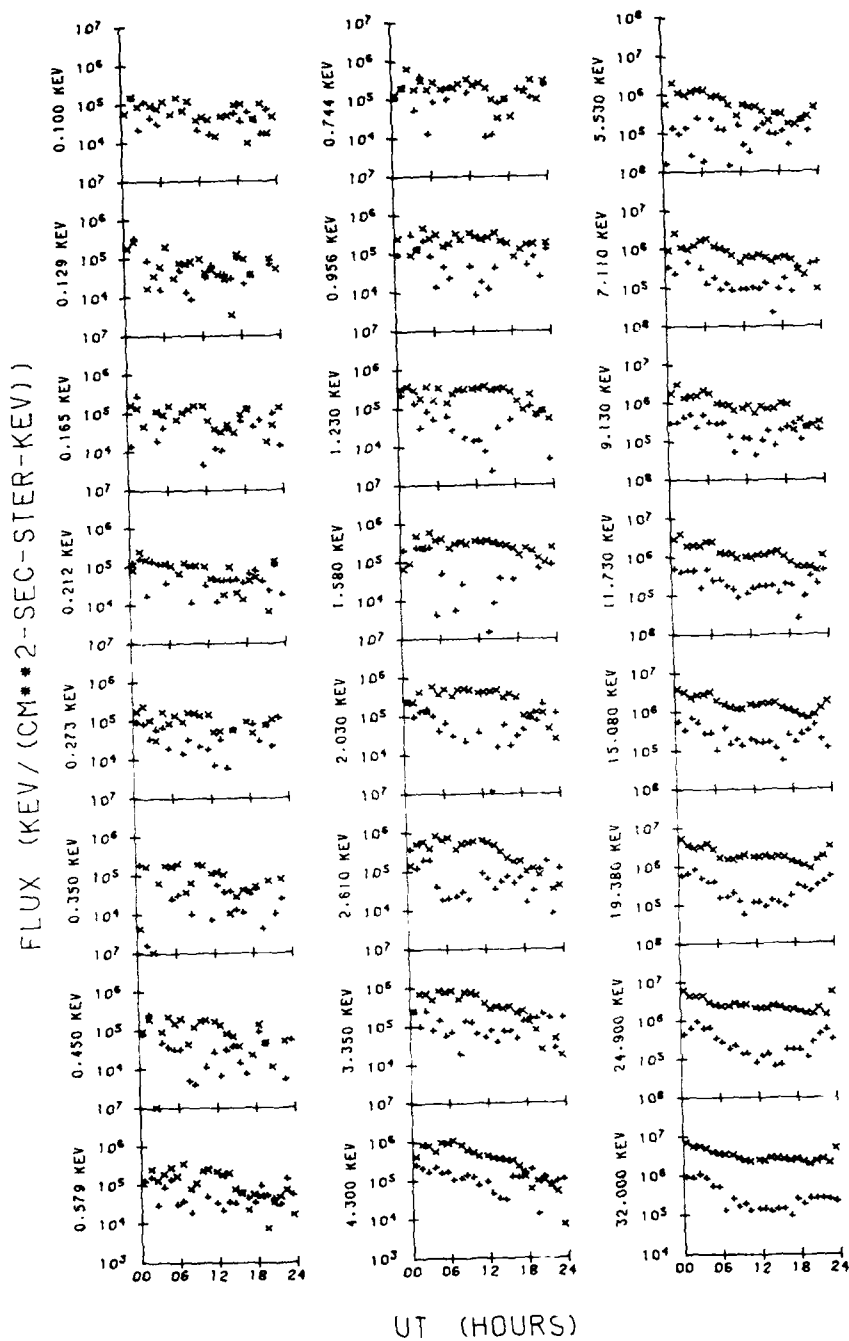


IONS

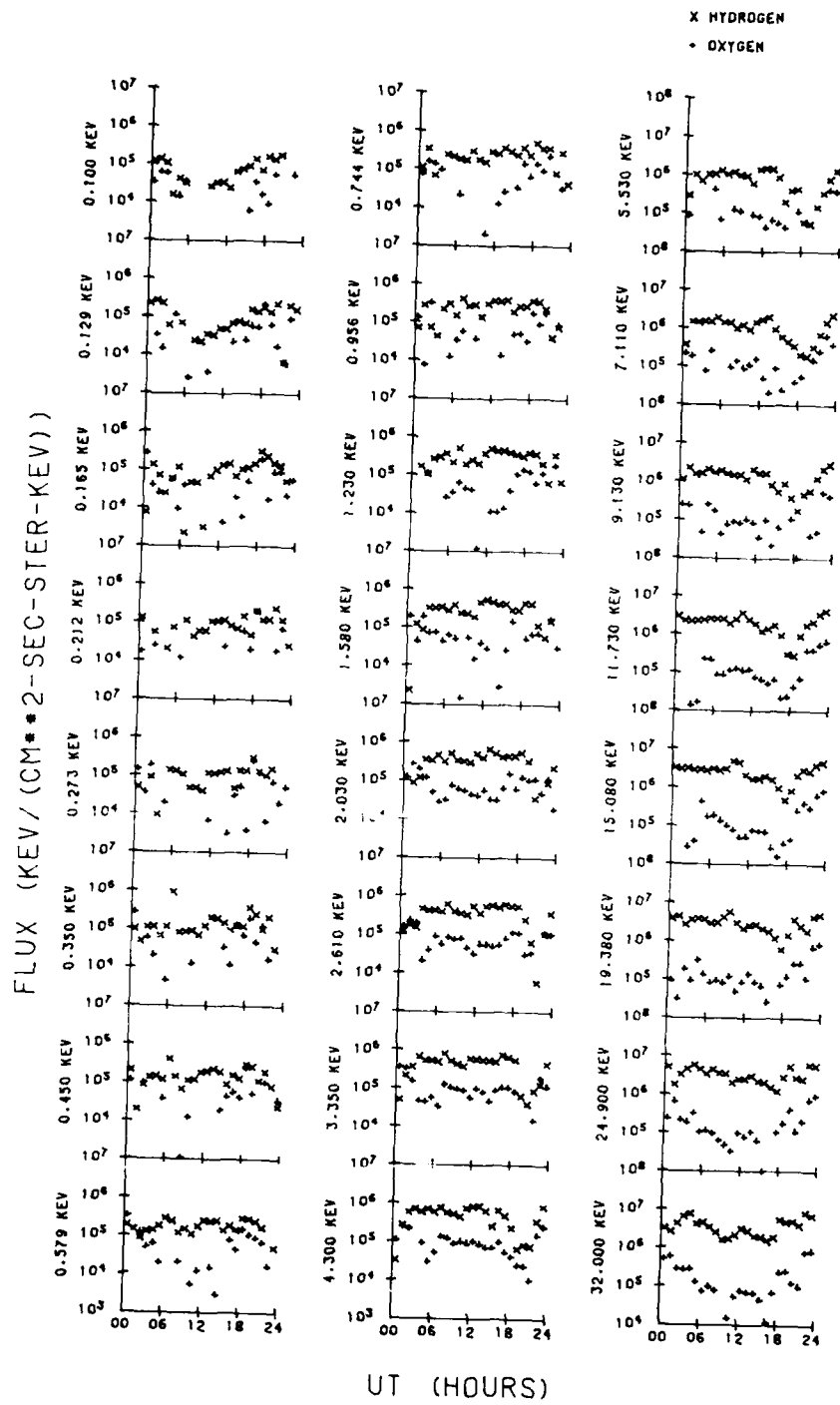


IONS

X HYDROGEN
• OXYGEN



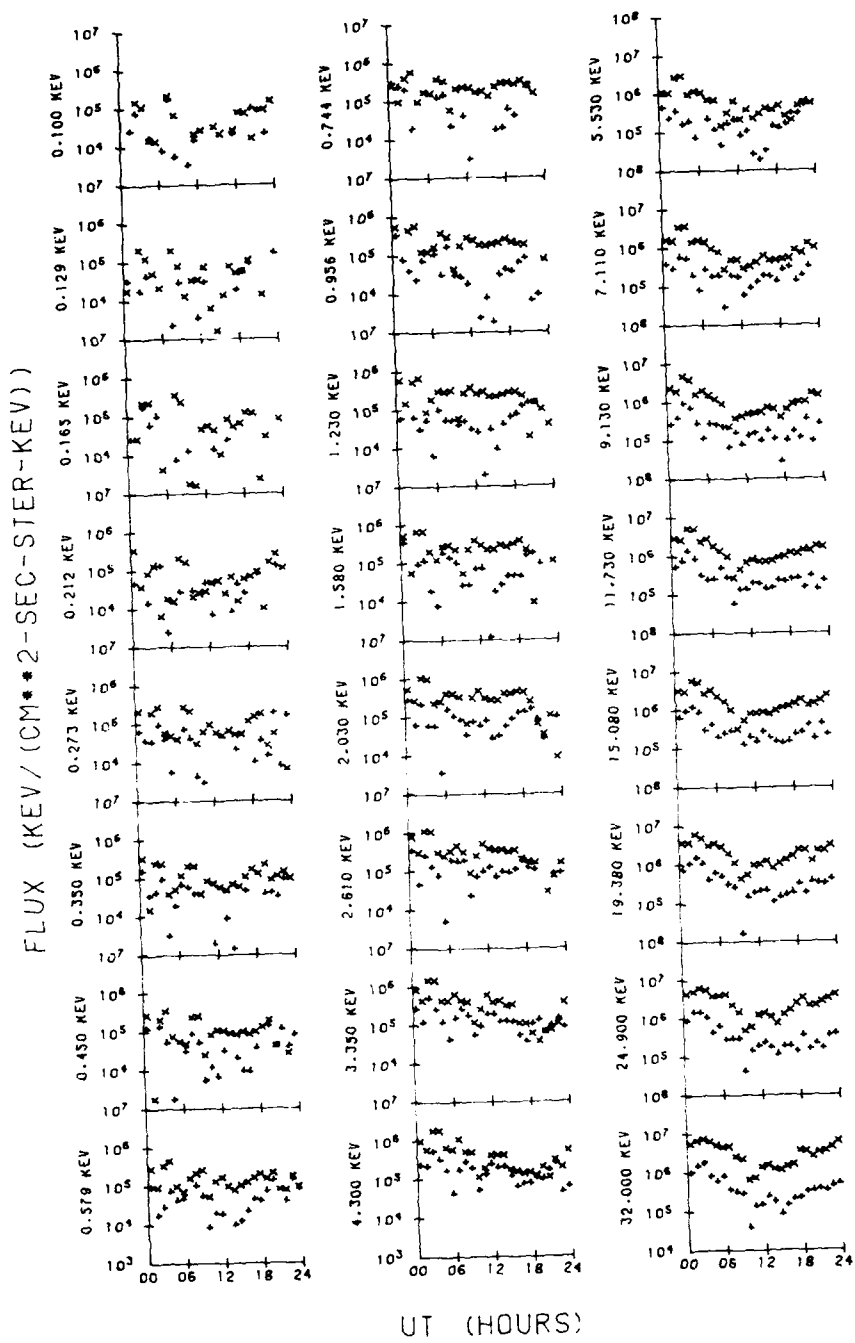
IONS



DAY 117

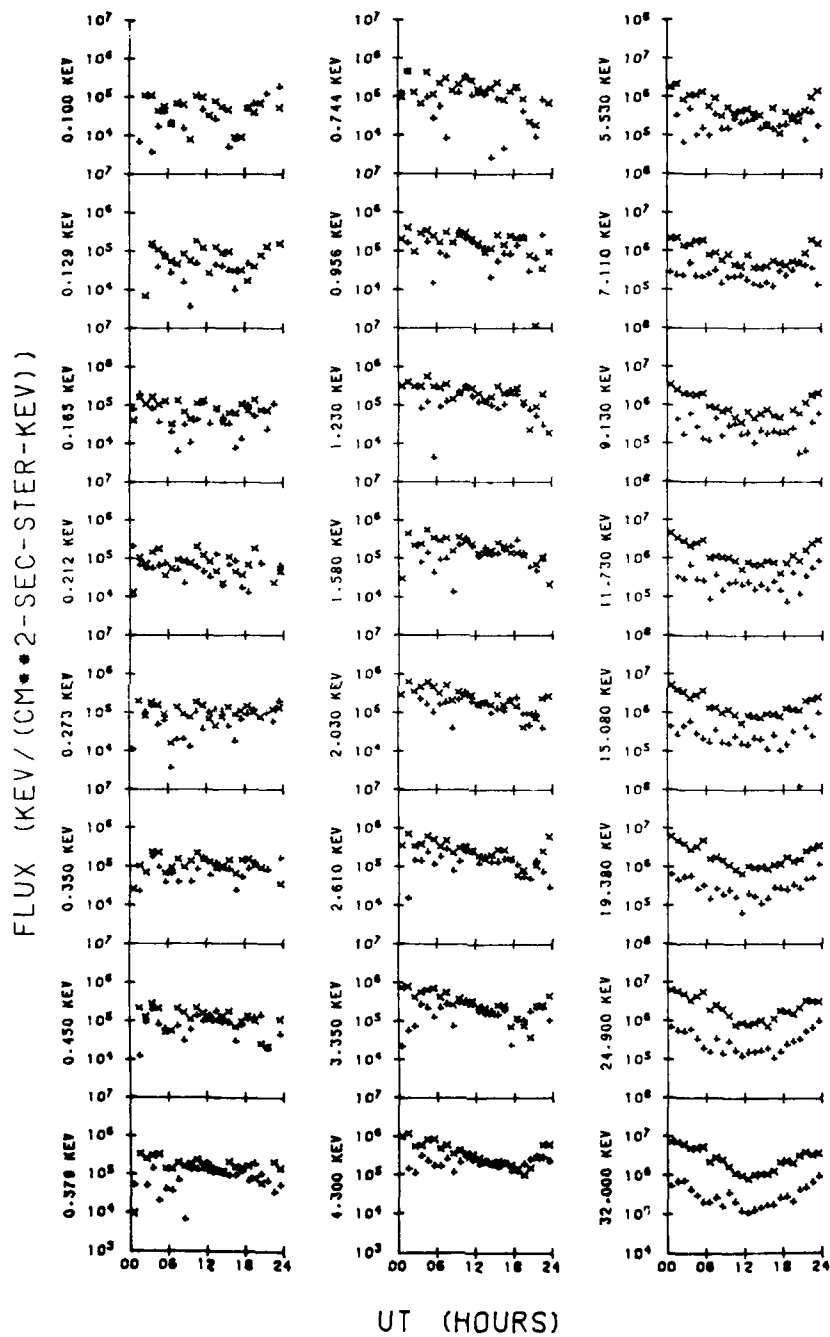
IONS

X HYDROGEN
• OXYGEN



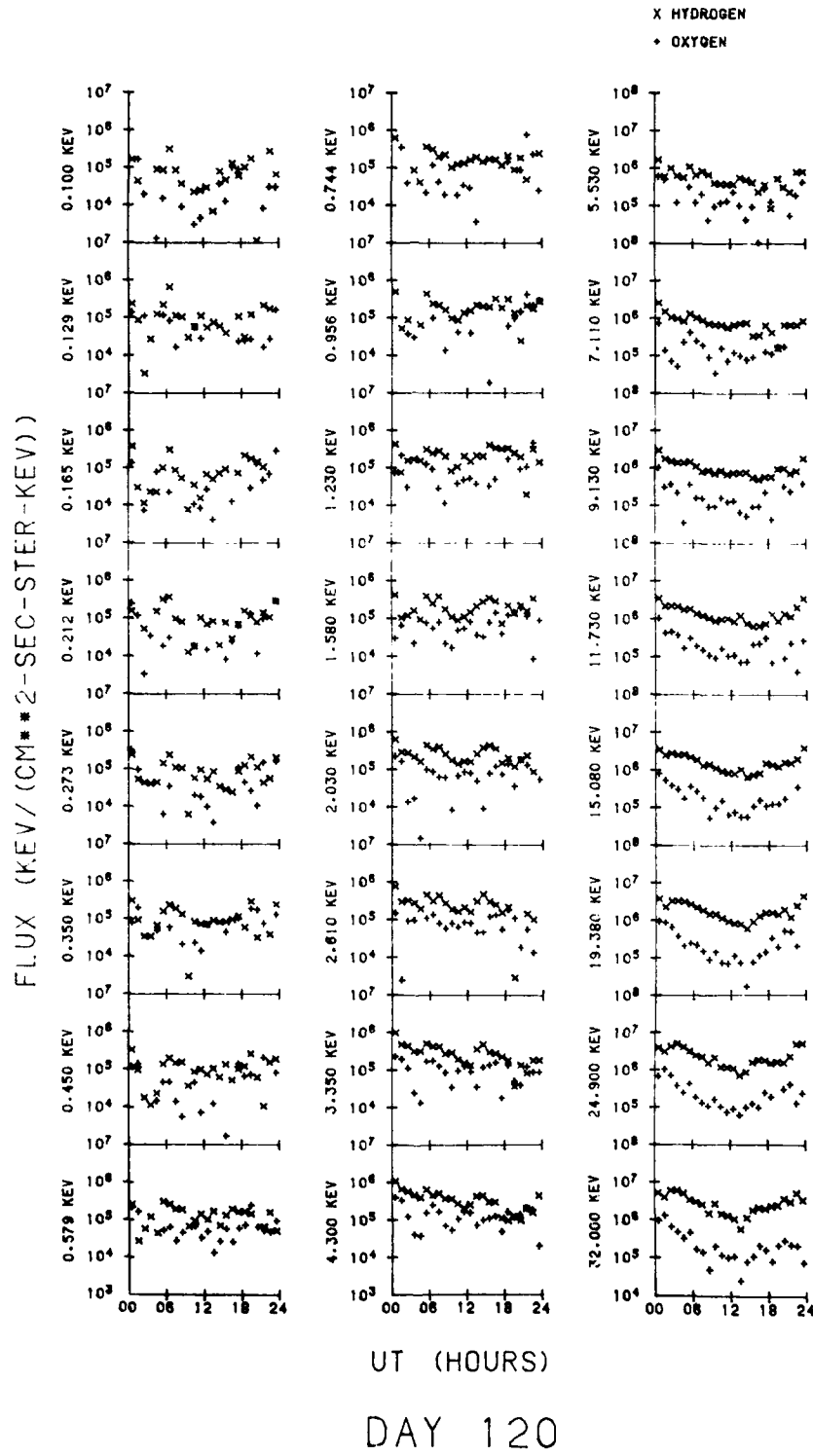
IONS

X HYDROGEN
+ OXYGEN

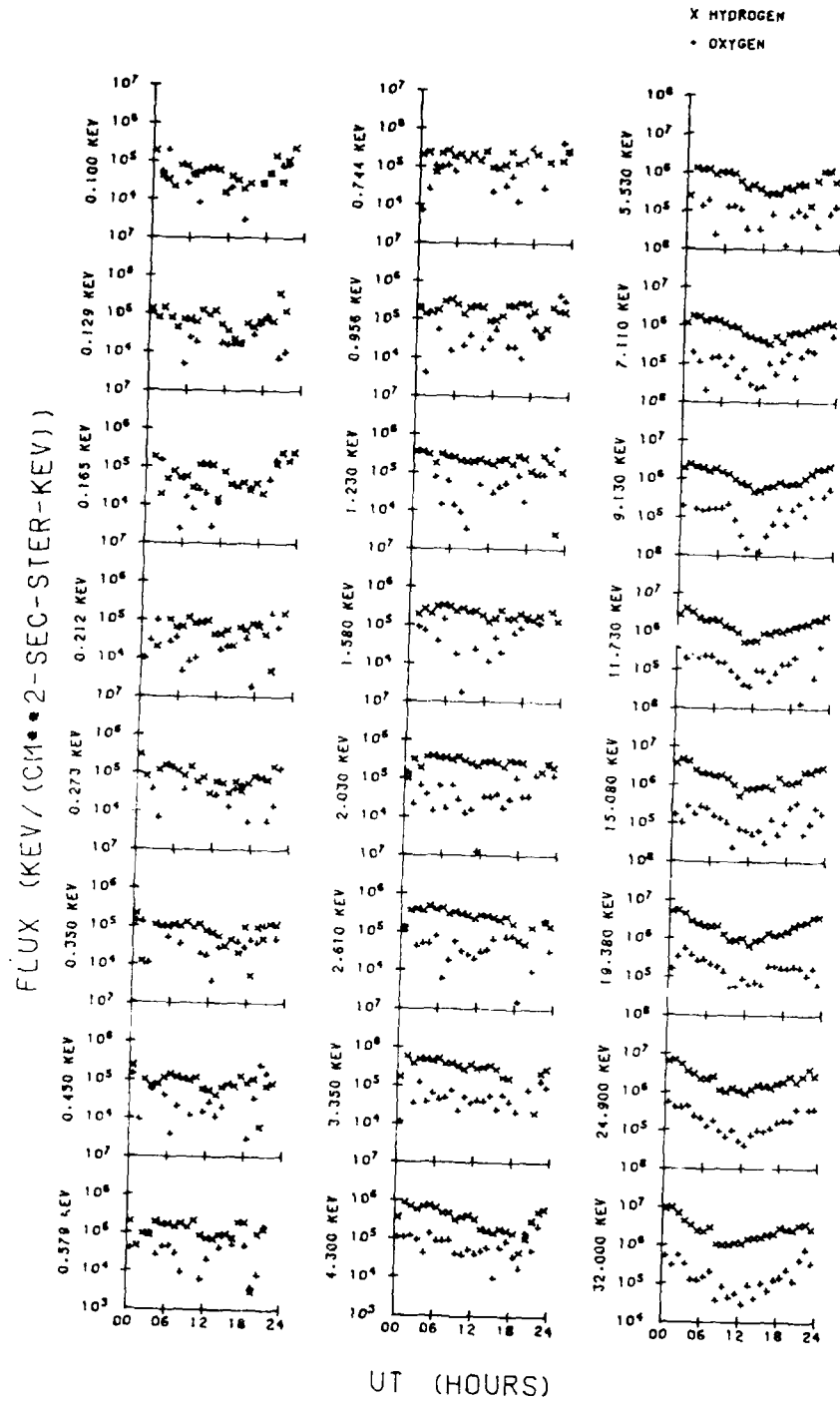


DAY 119

IONS



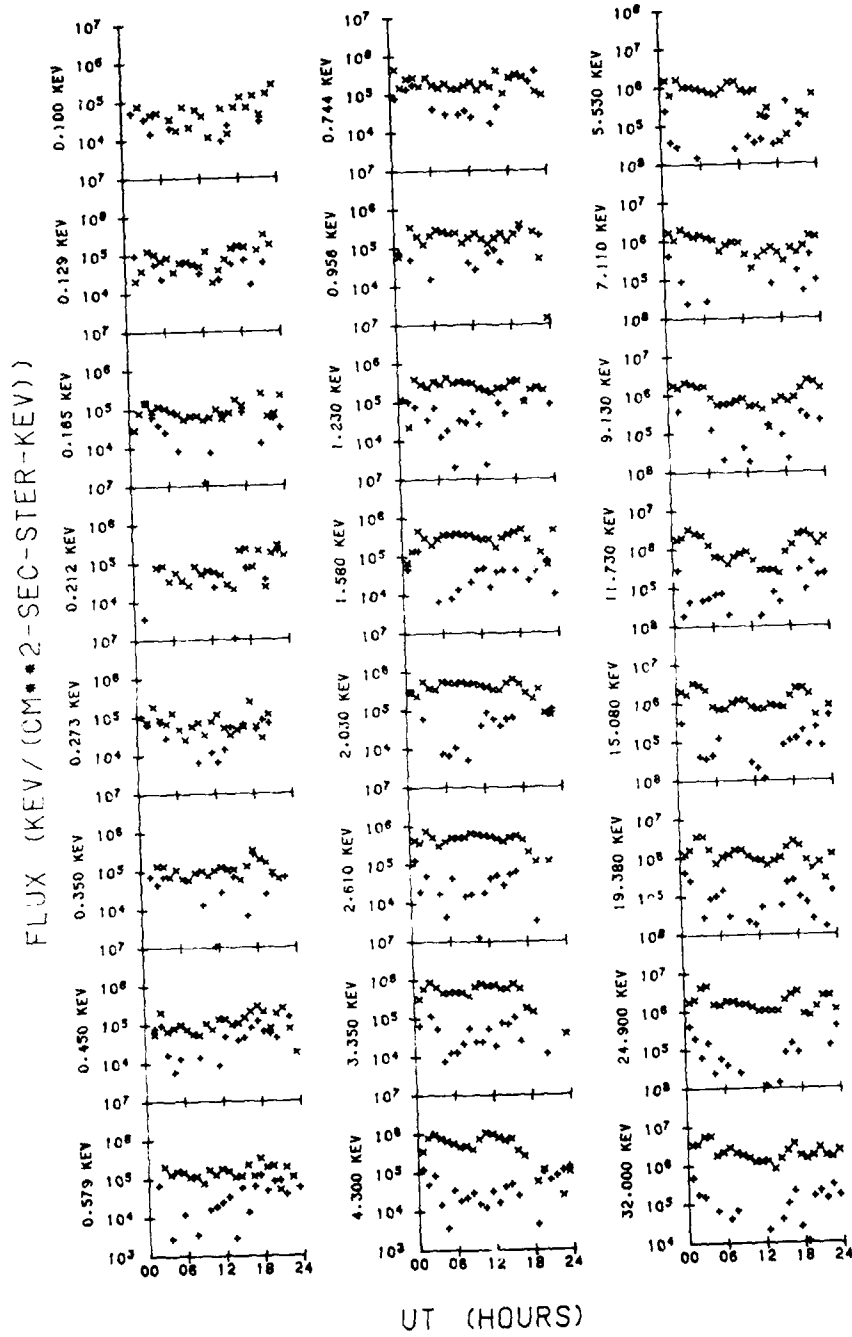
IONS



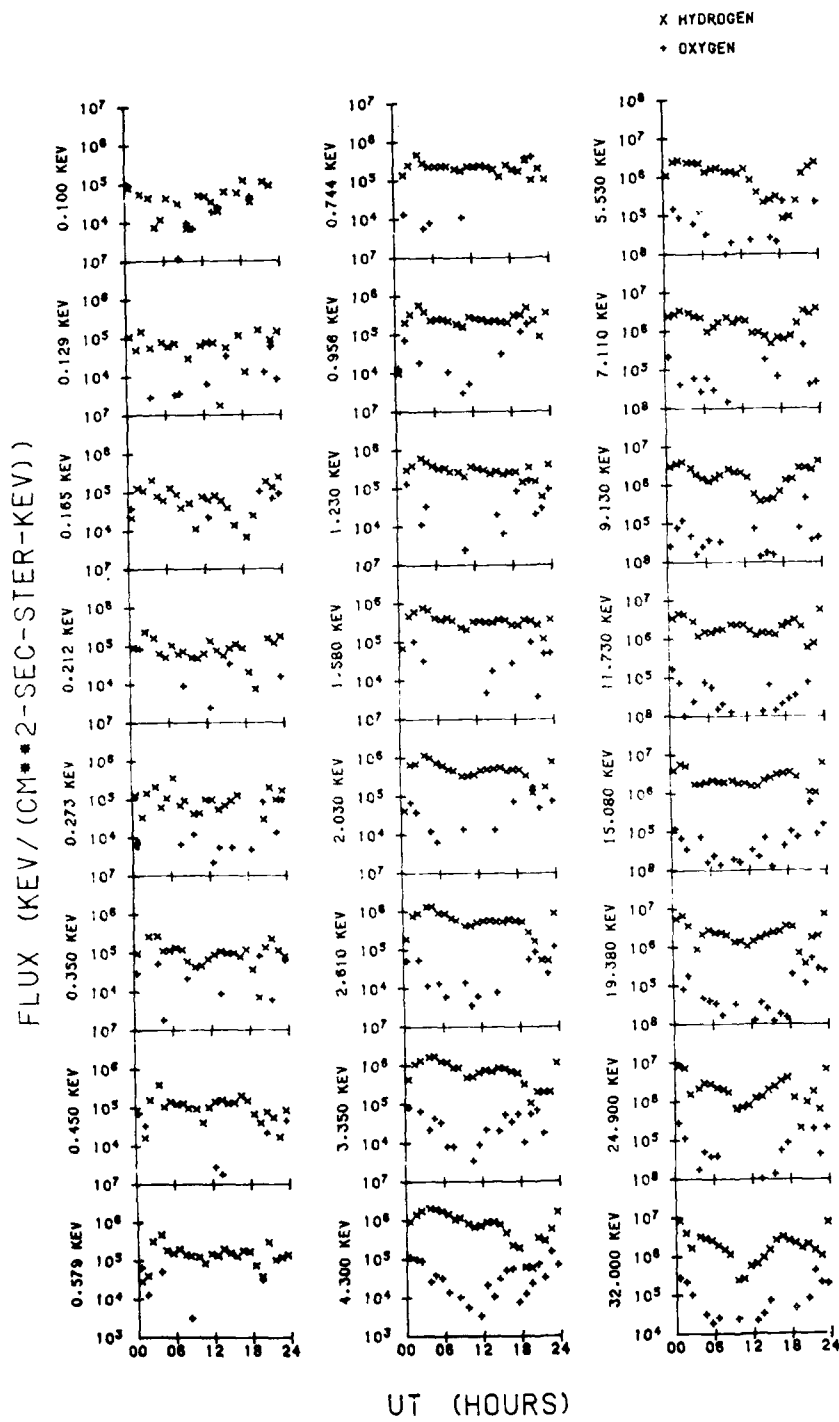
DAY 122

IONS

X HYDROGEN
+ OXYGEN

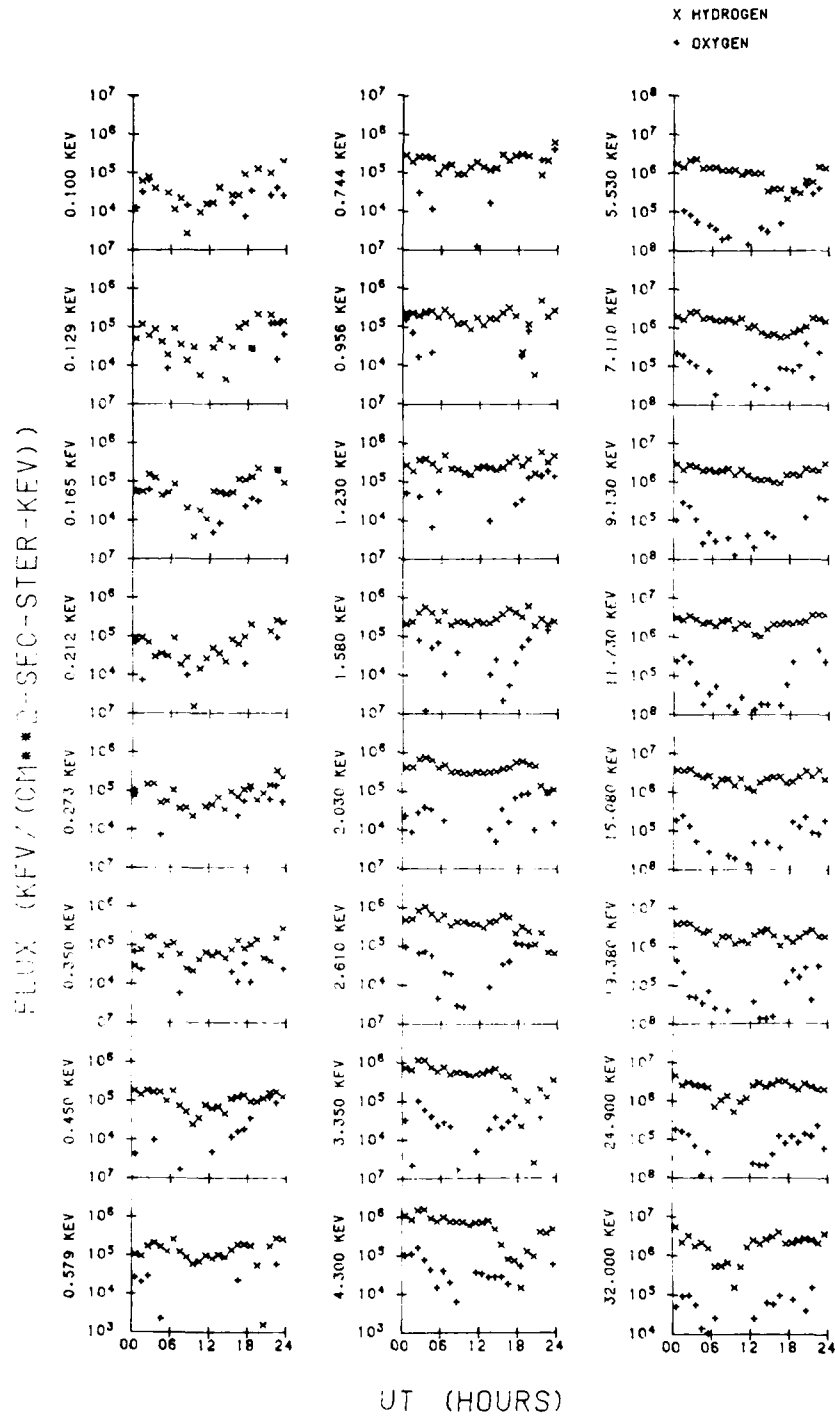


IONS



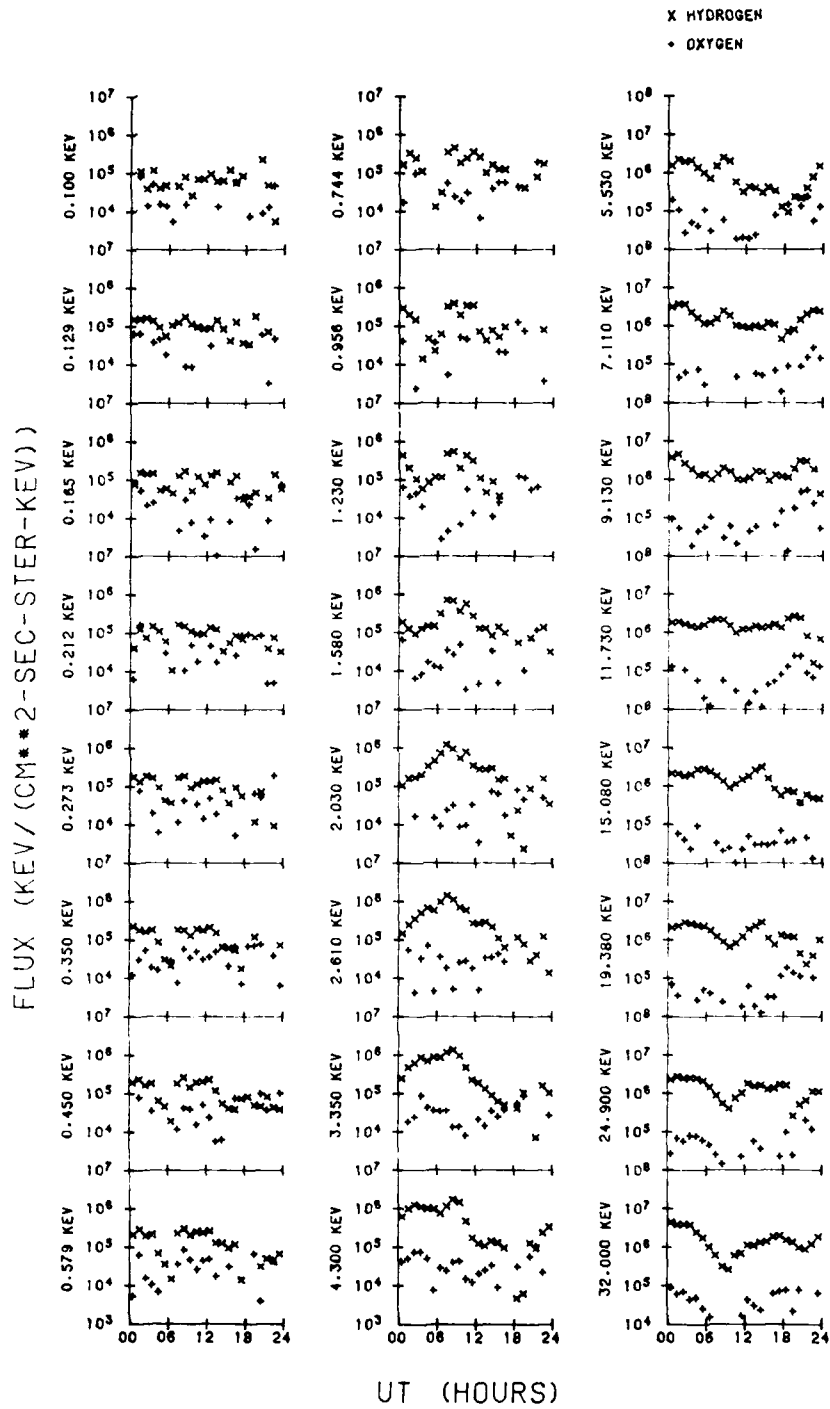
DAY 124

IONS



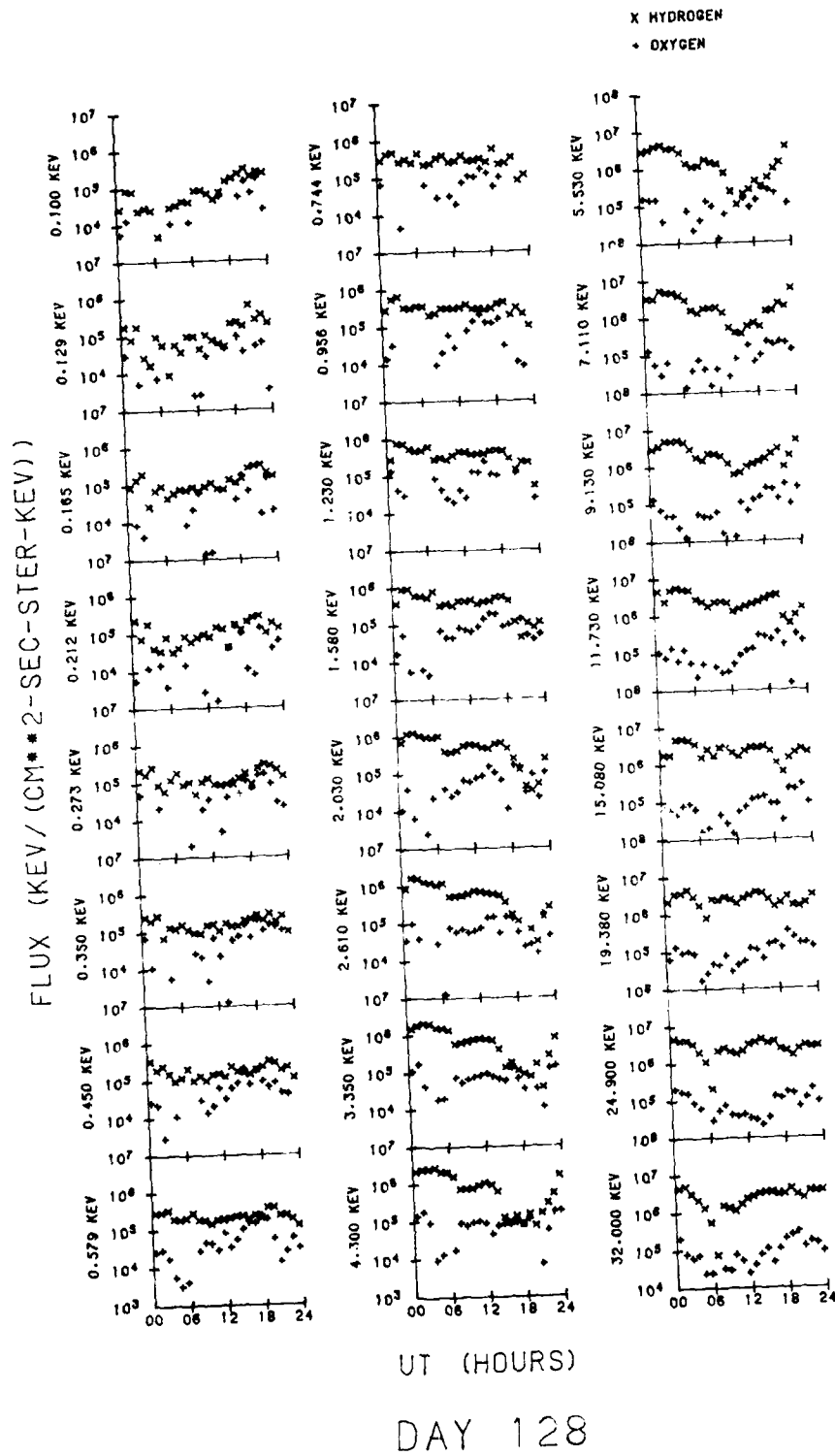
DAY 125

IONS

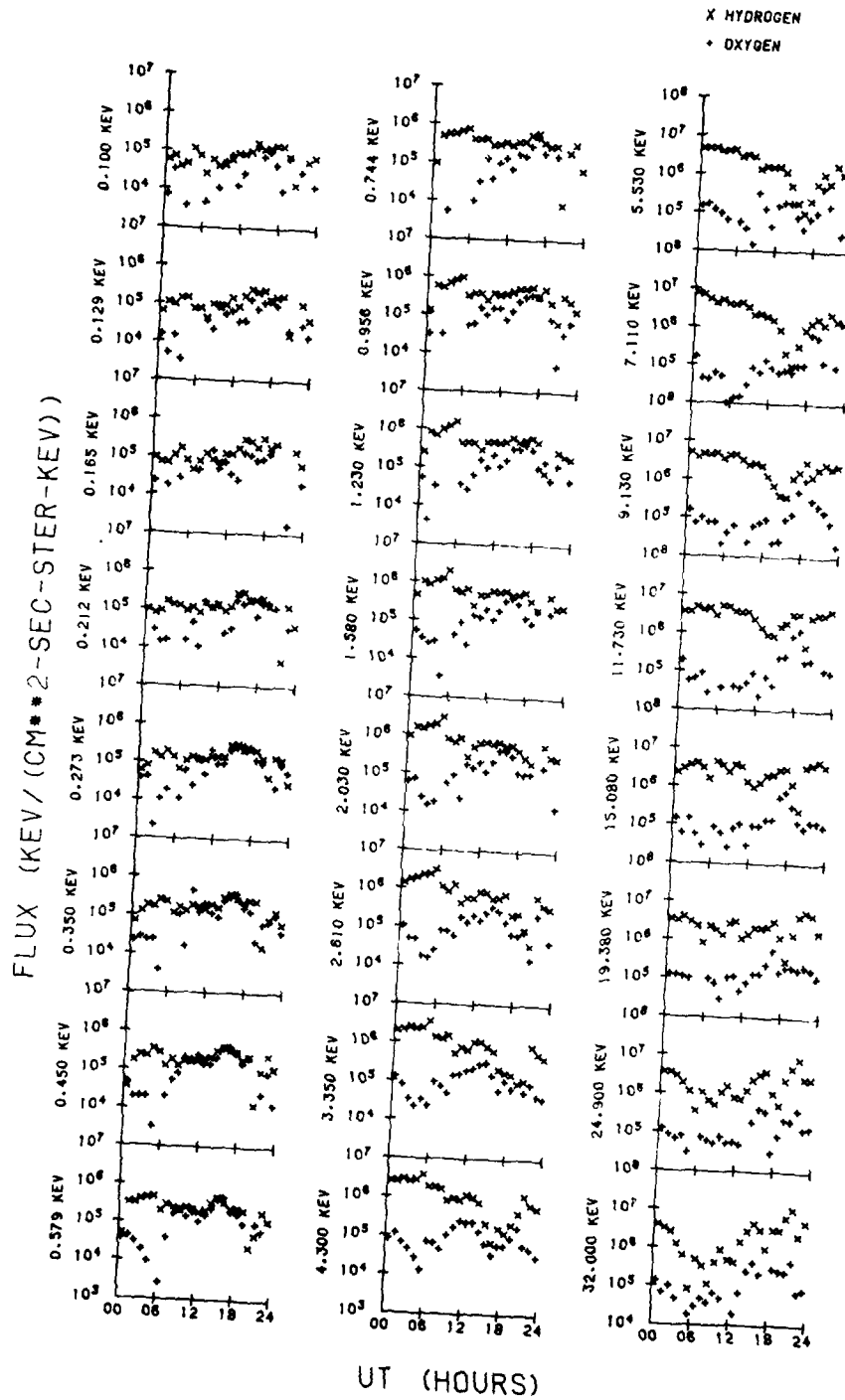


DAY 126

IONS



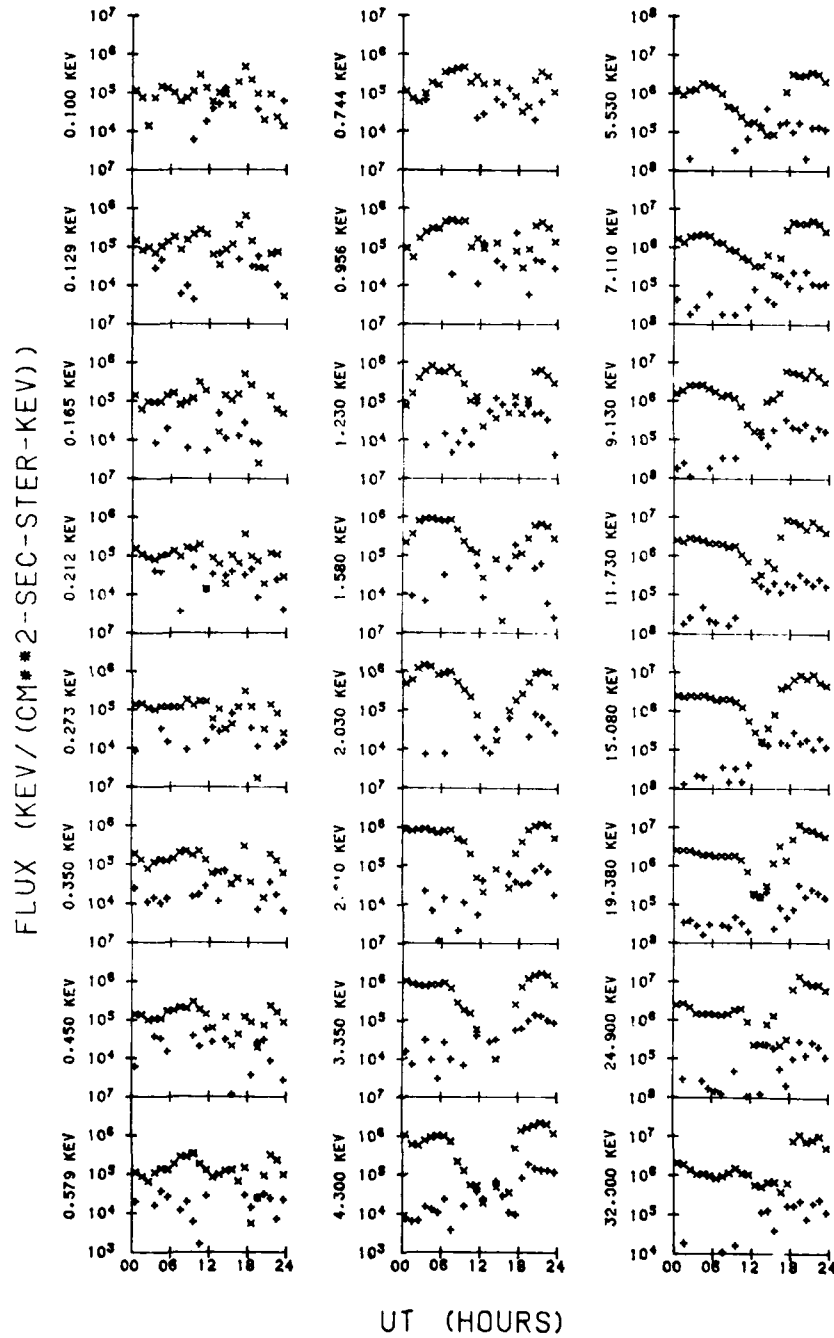
IONS



DAY 129

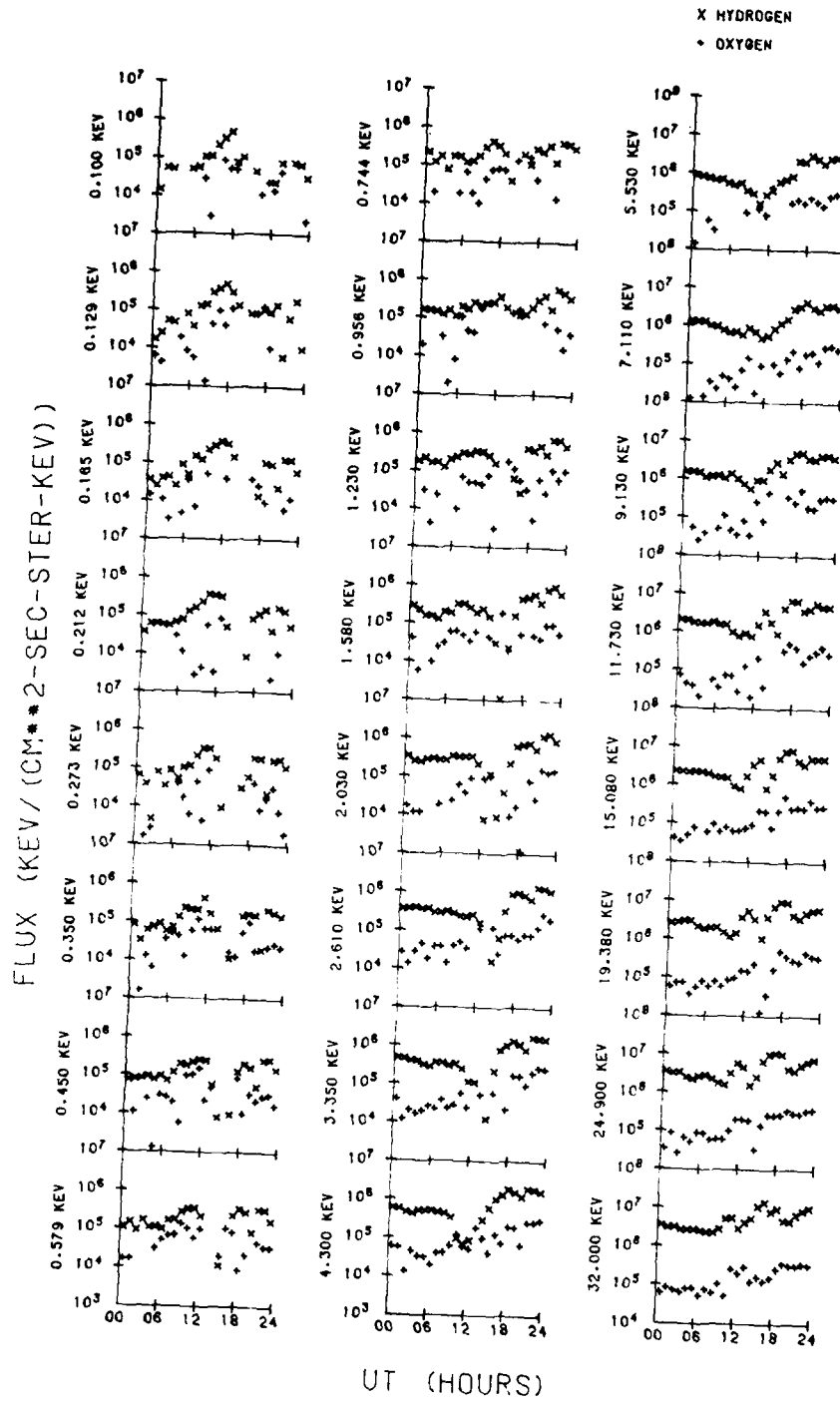
IONS

X HYDROGEN
+ OXYGEN



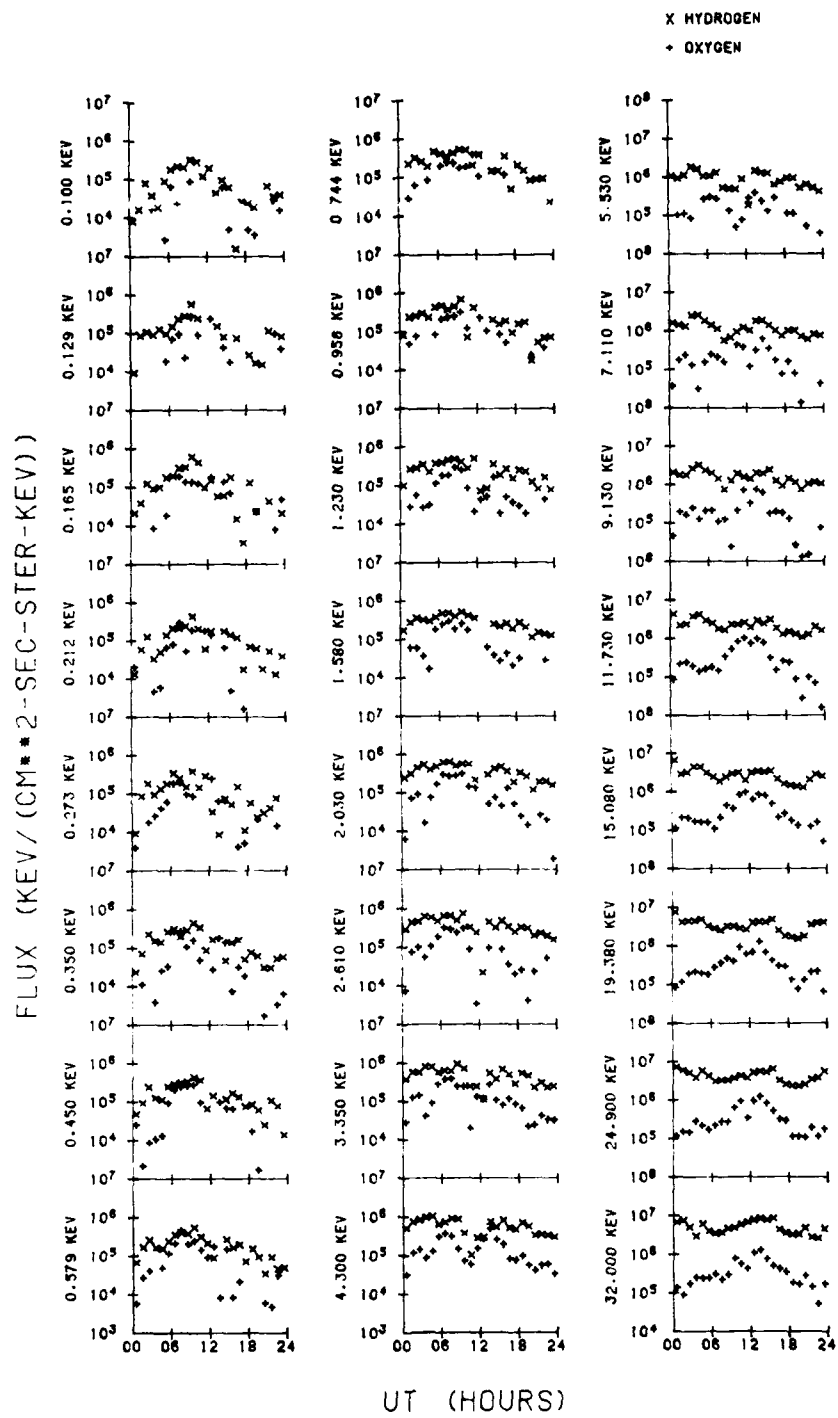
DAY 138

IONS



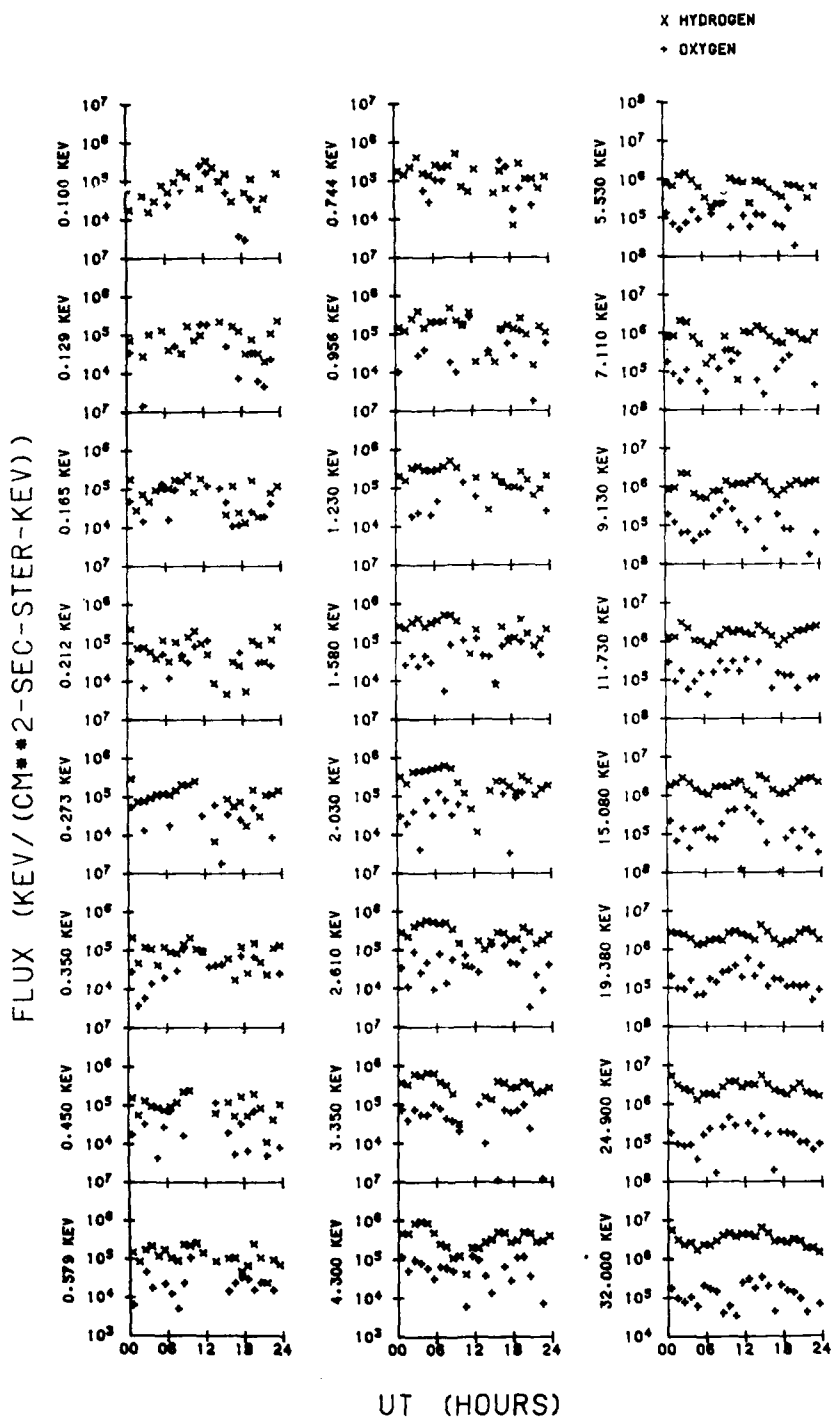
DAY 141

IONS



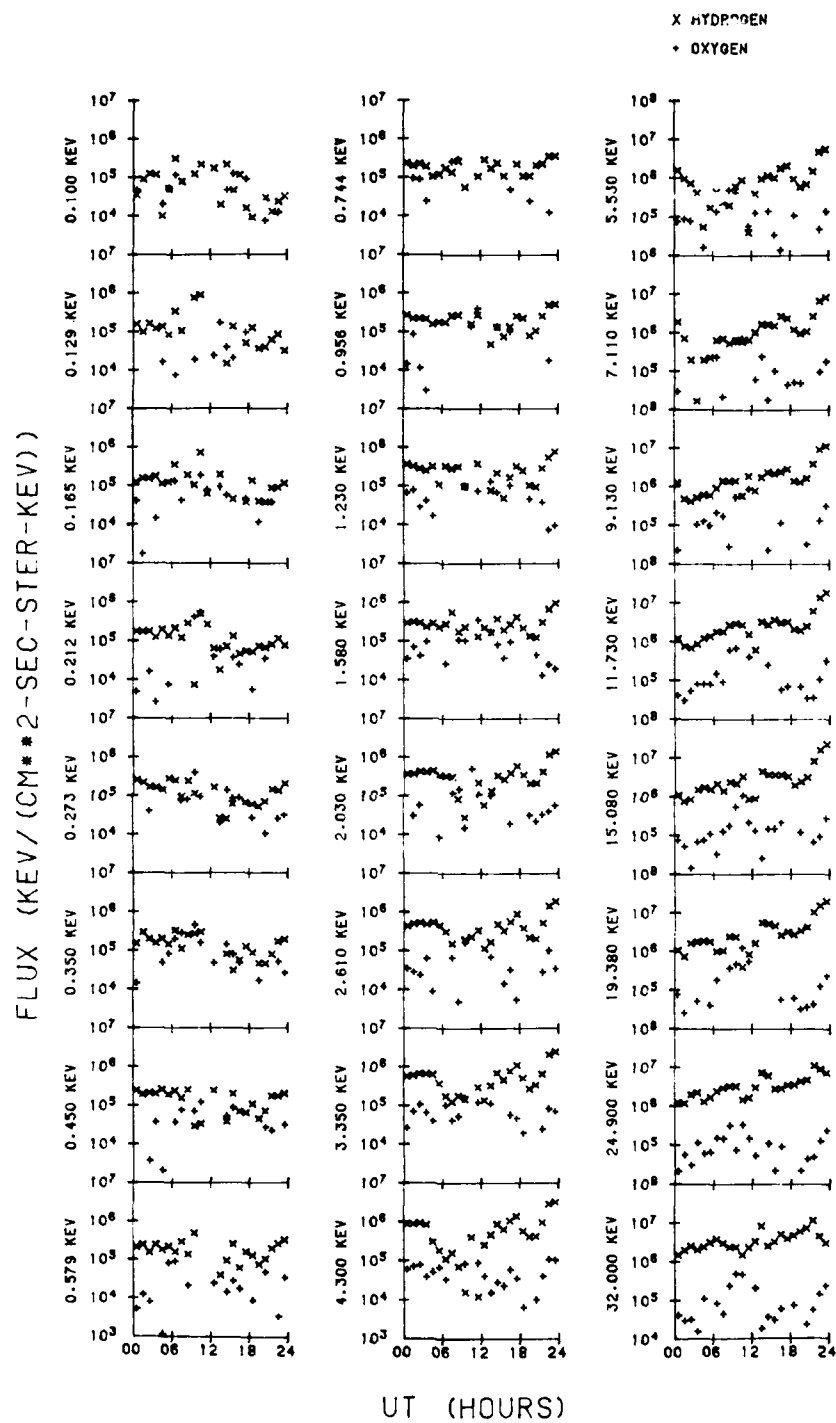
DAY 145

IONS



DAY 146

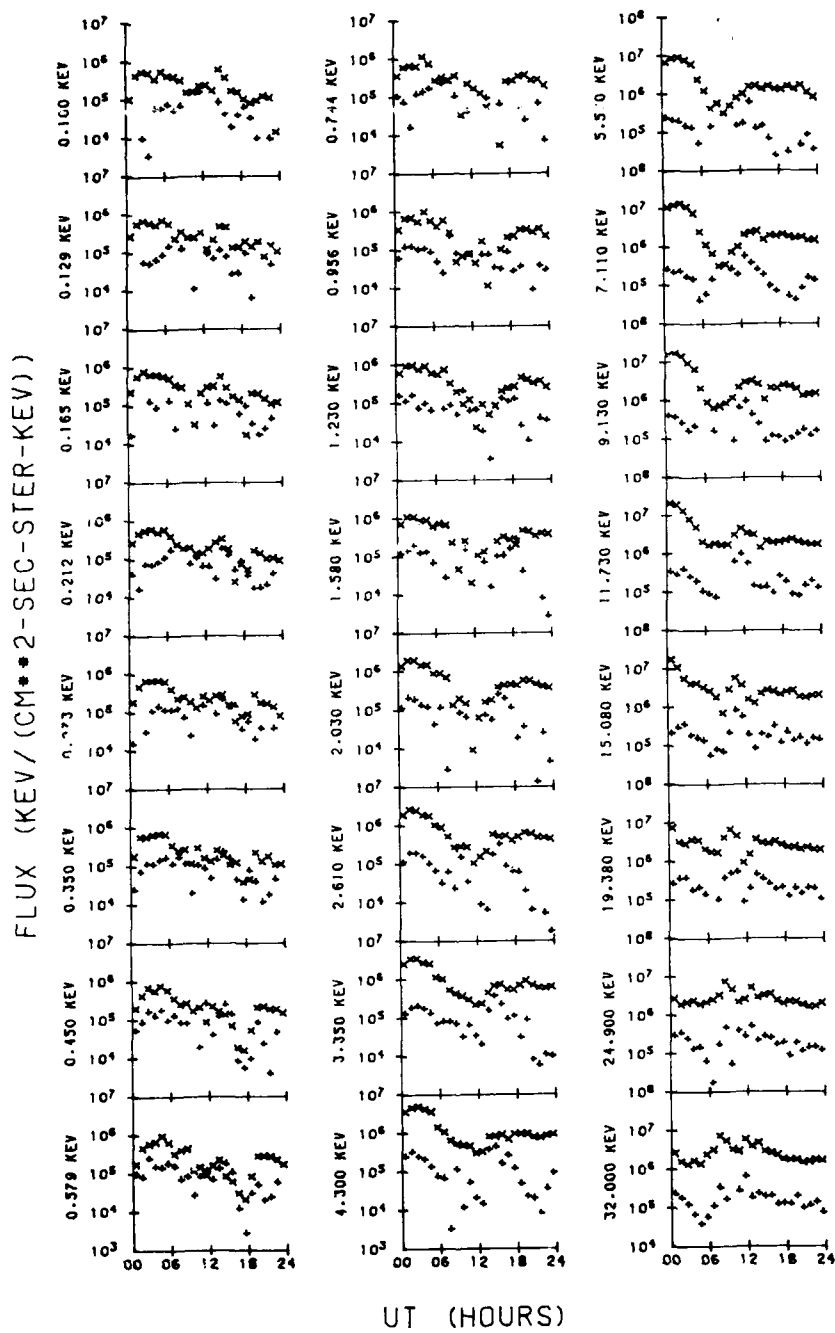
IONS



DAY 149

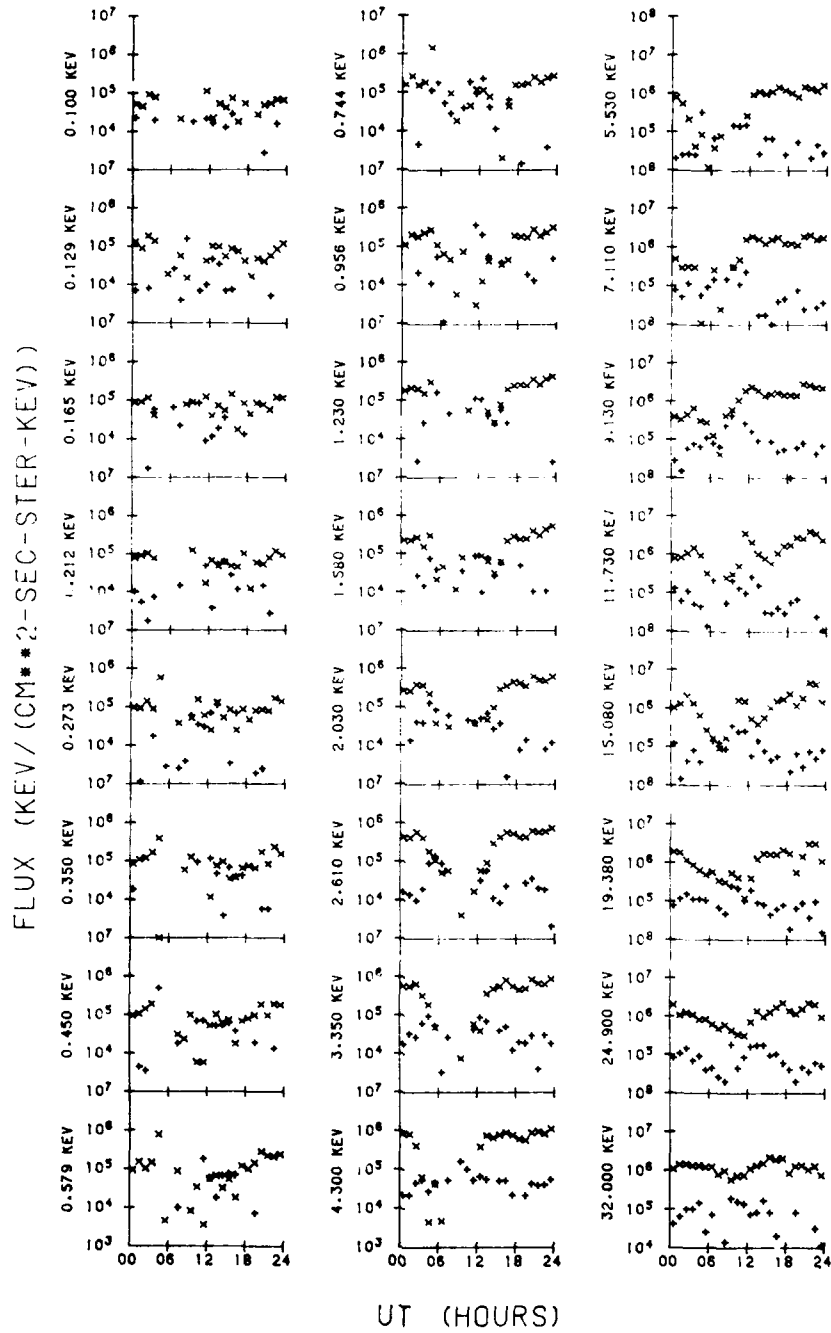
IONS

X HYDROGEN
• OXYGEN



IONS

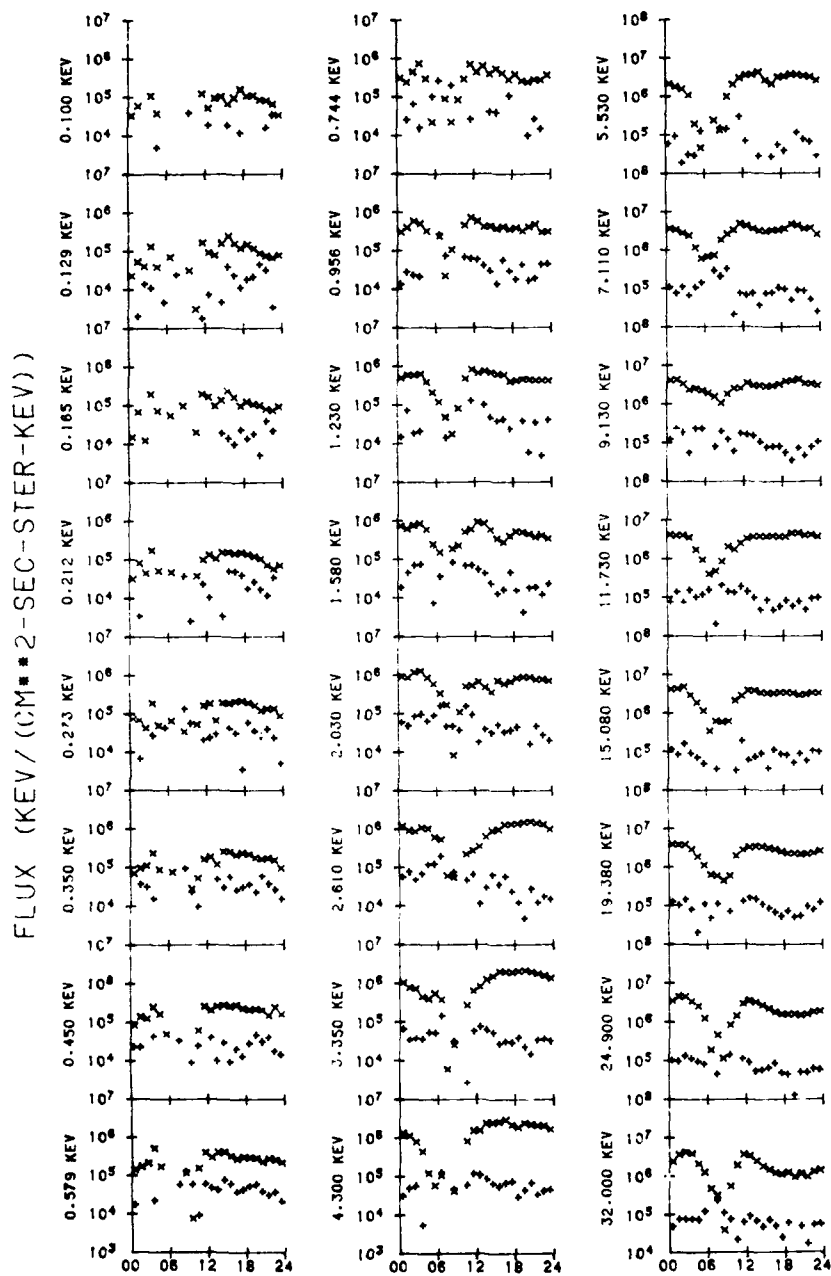
X HYDROGEN
• OXYGEN



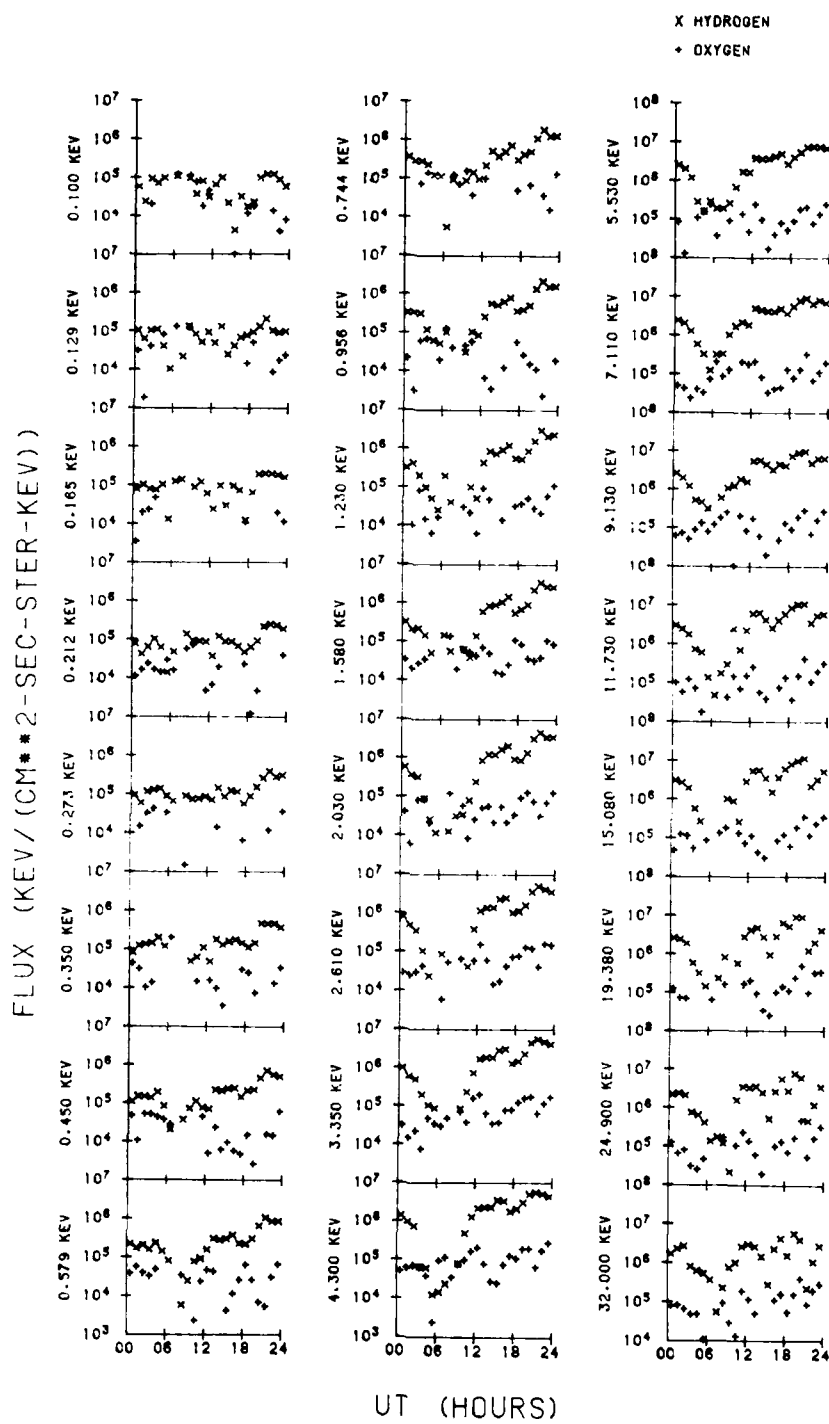
DAY 152

IONS

X HYDROGEN
+ OXYGEN

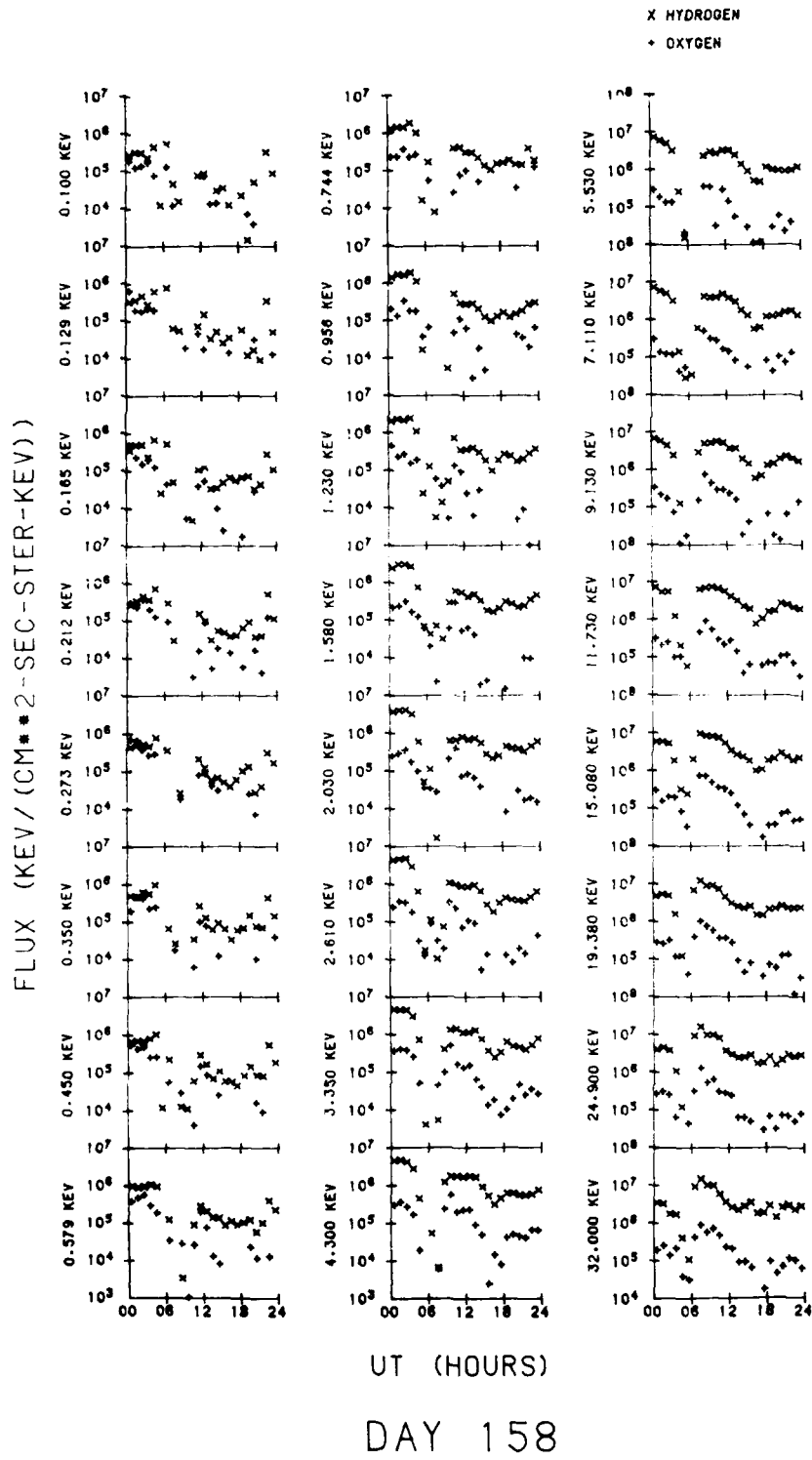


IONS

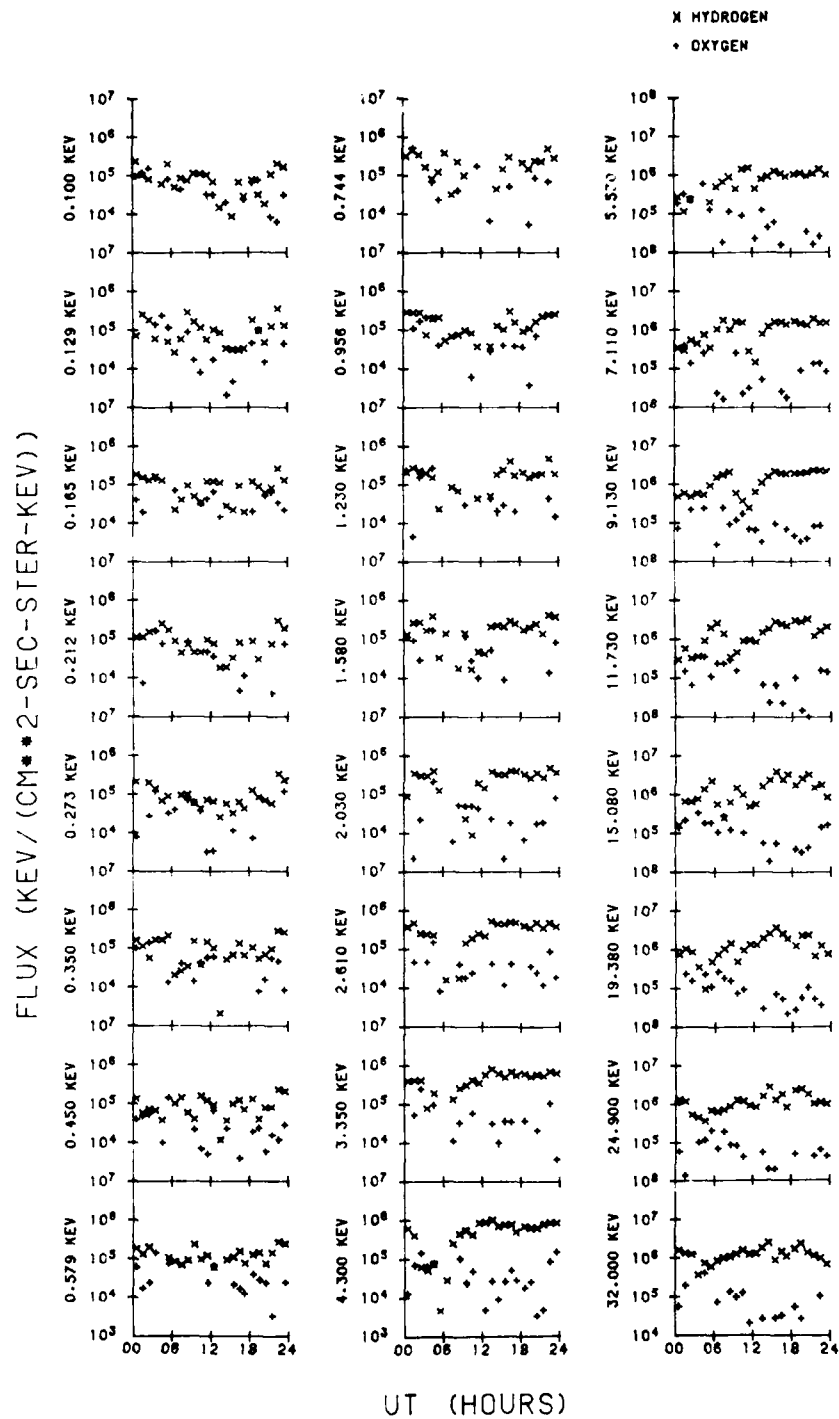


DAY 157

IONS

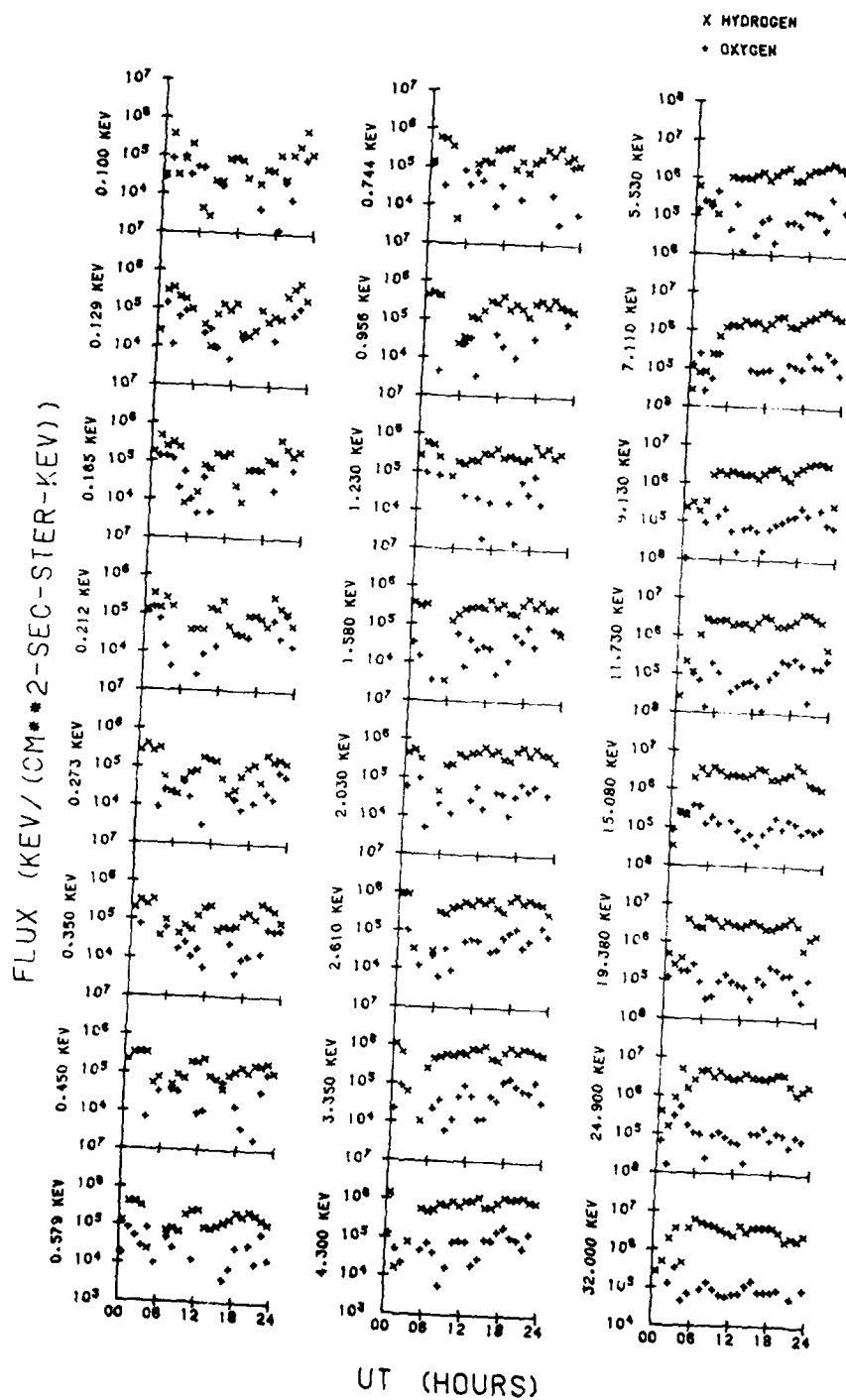


IONS



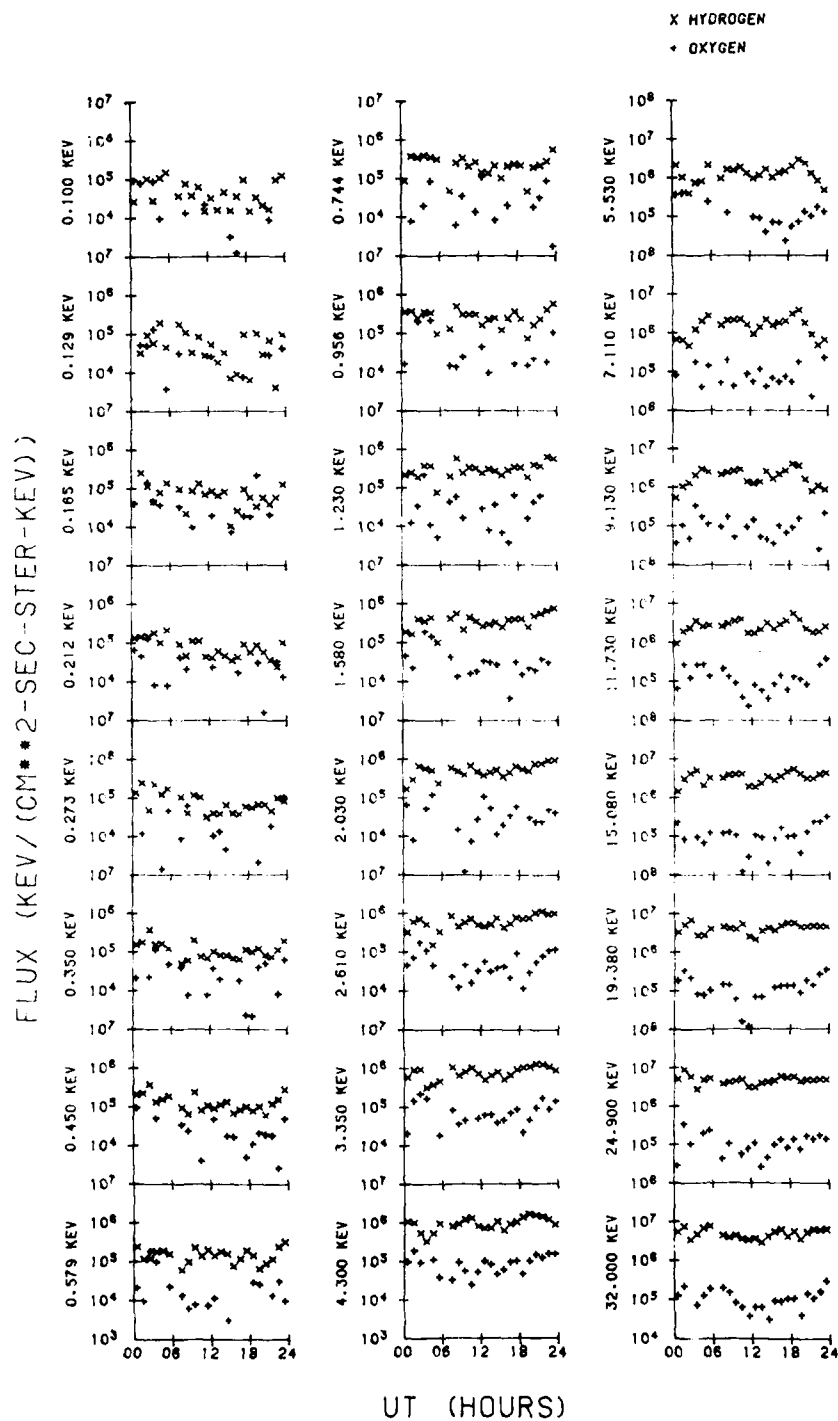
DAY 164

IONS



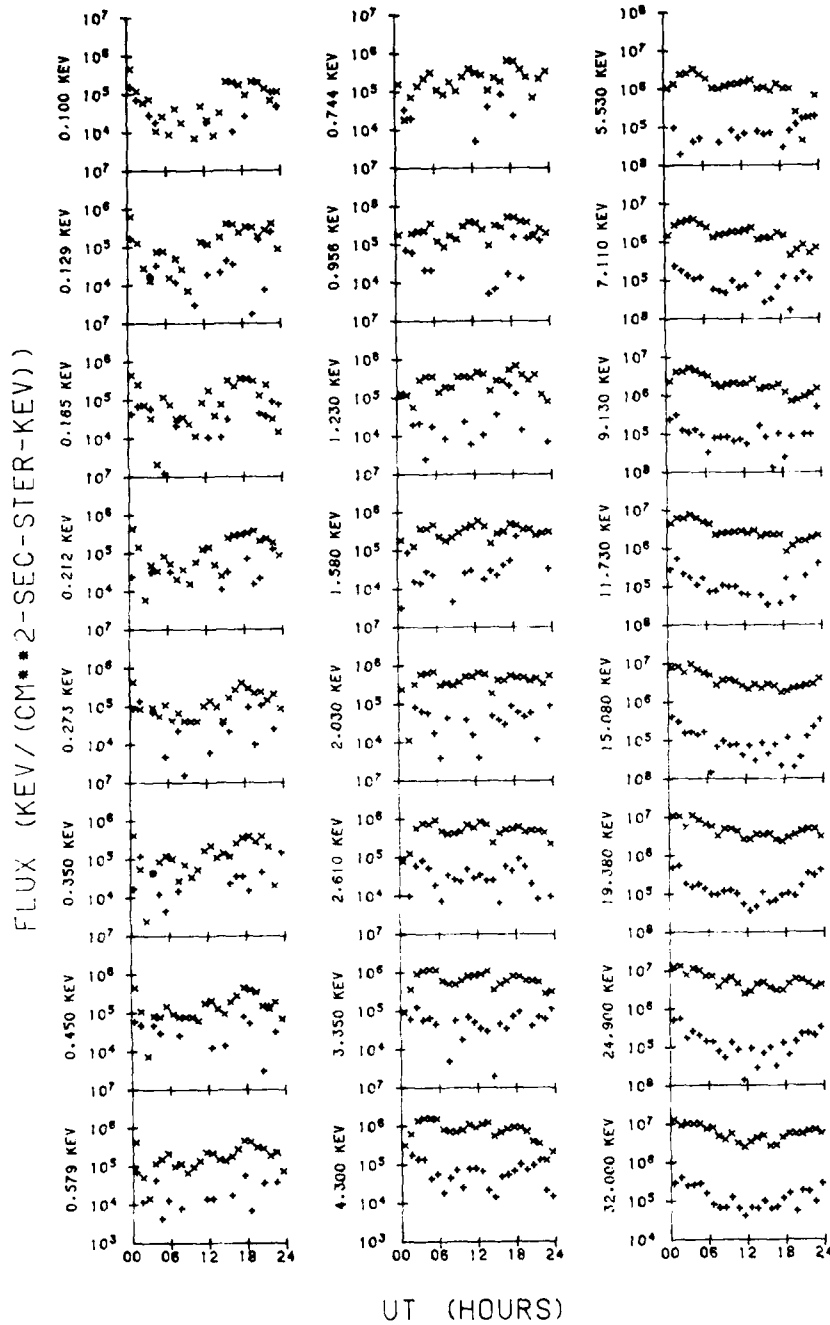
DAY 167

IONS



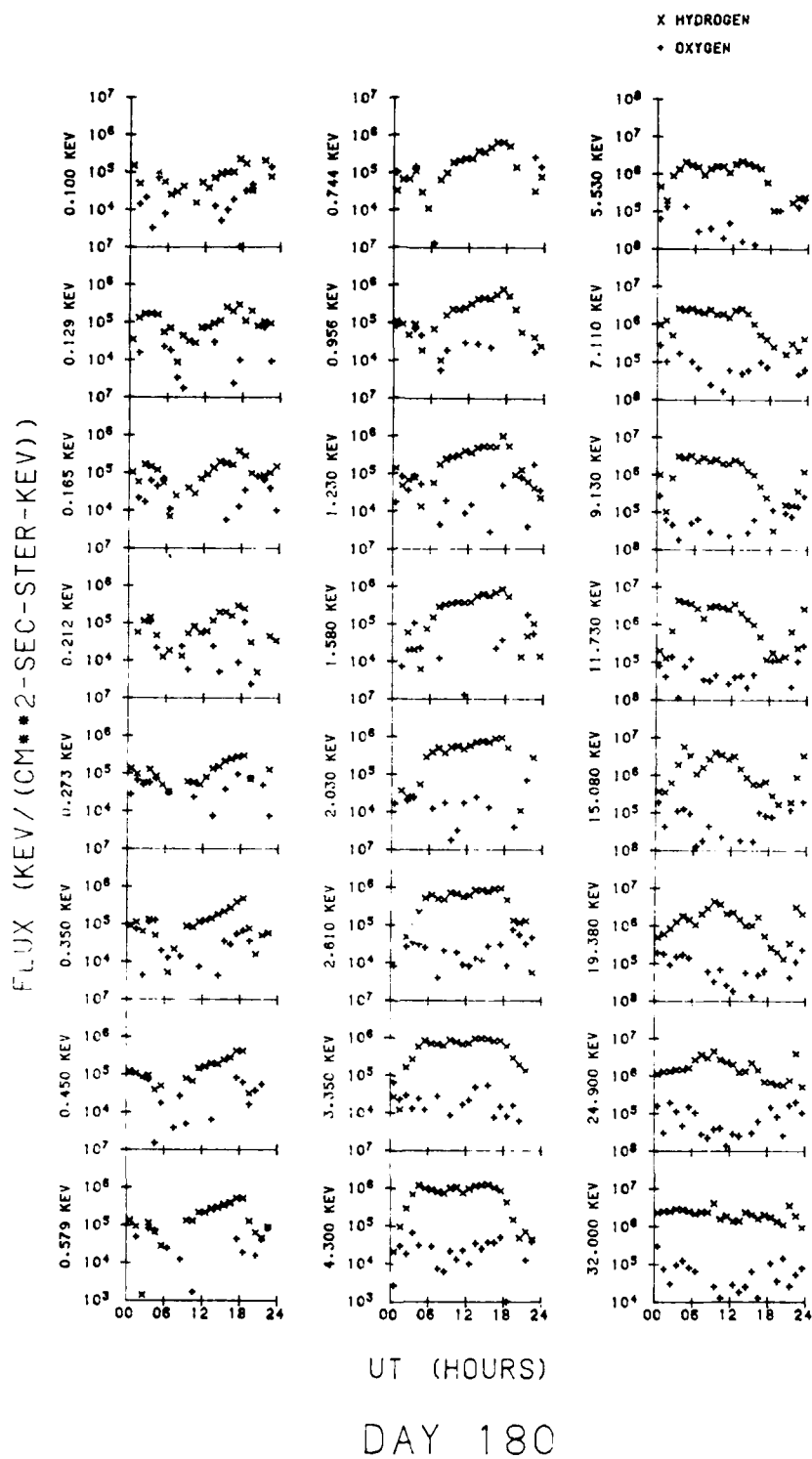
IONS

X HYDROGEN
• OXYGEN

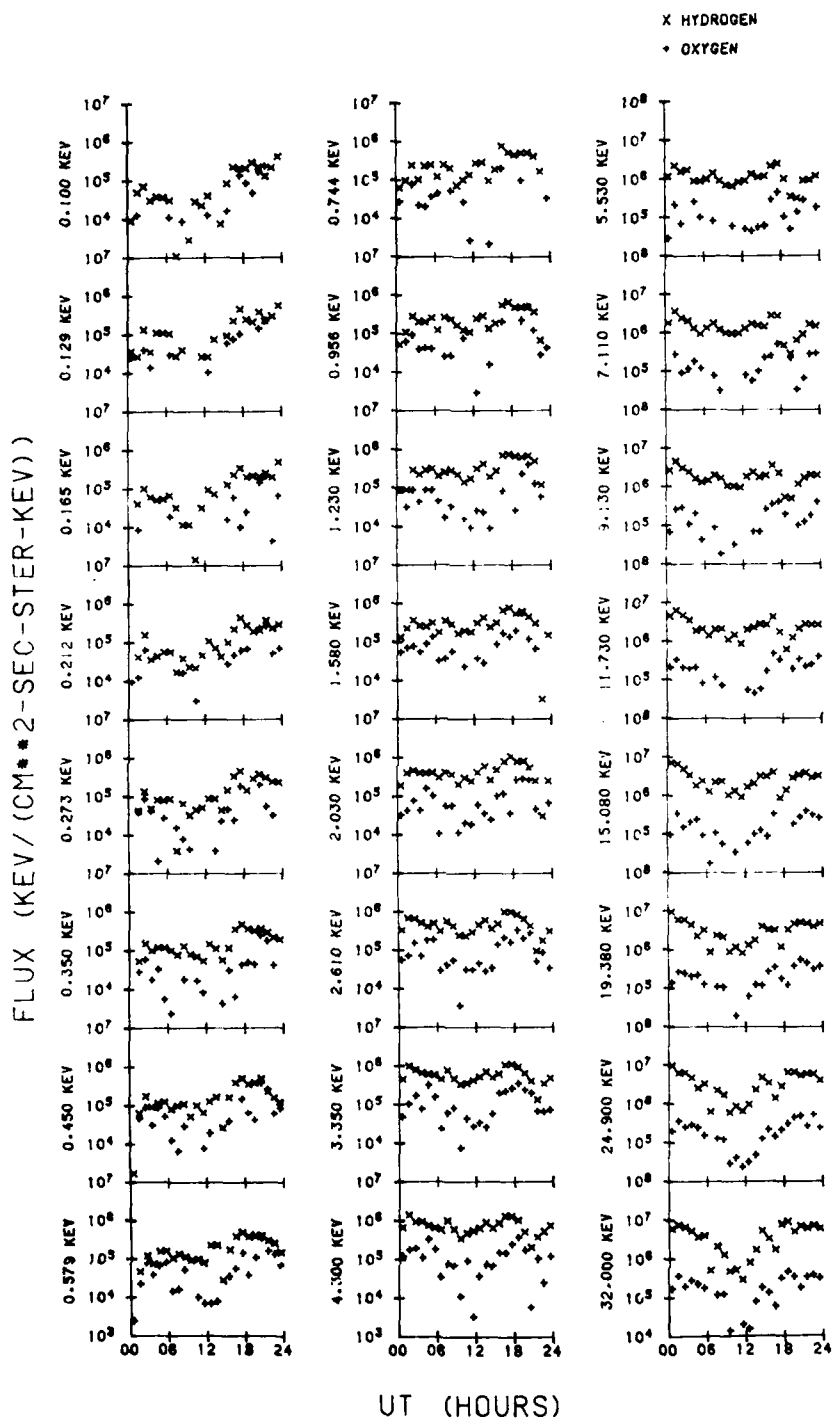


DAY 178

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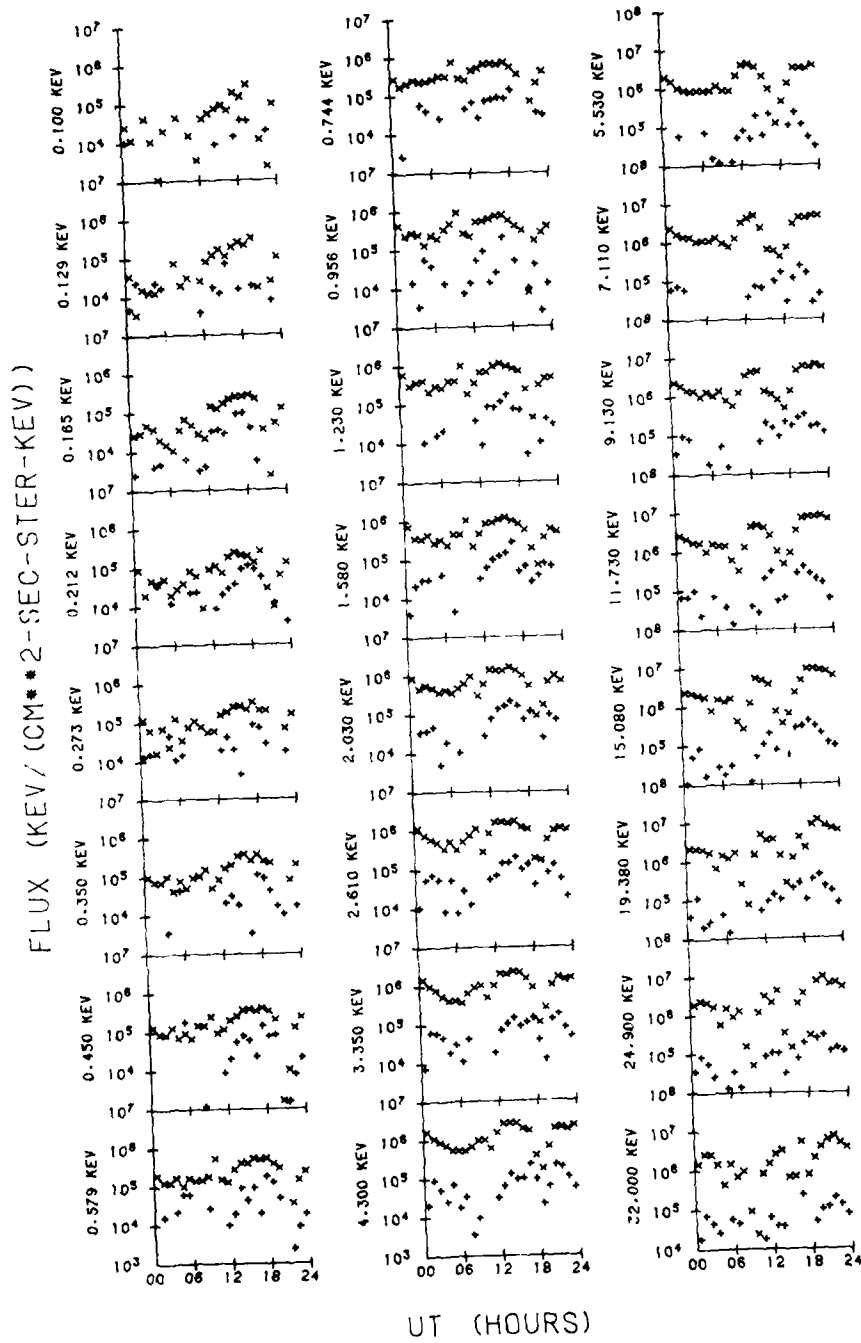


IONS



IONS

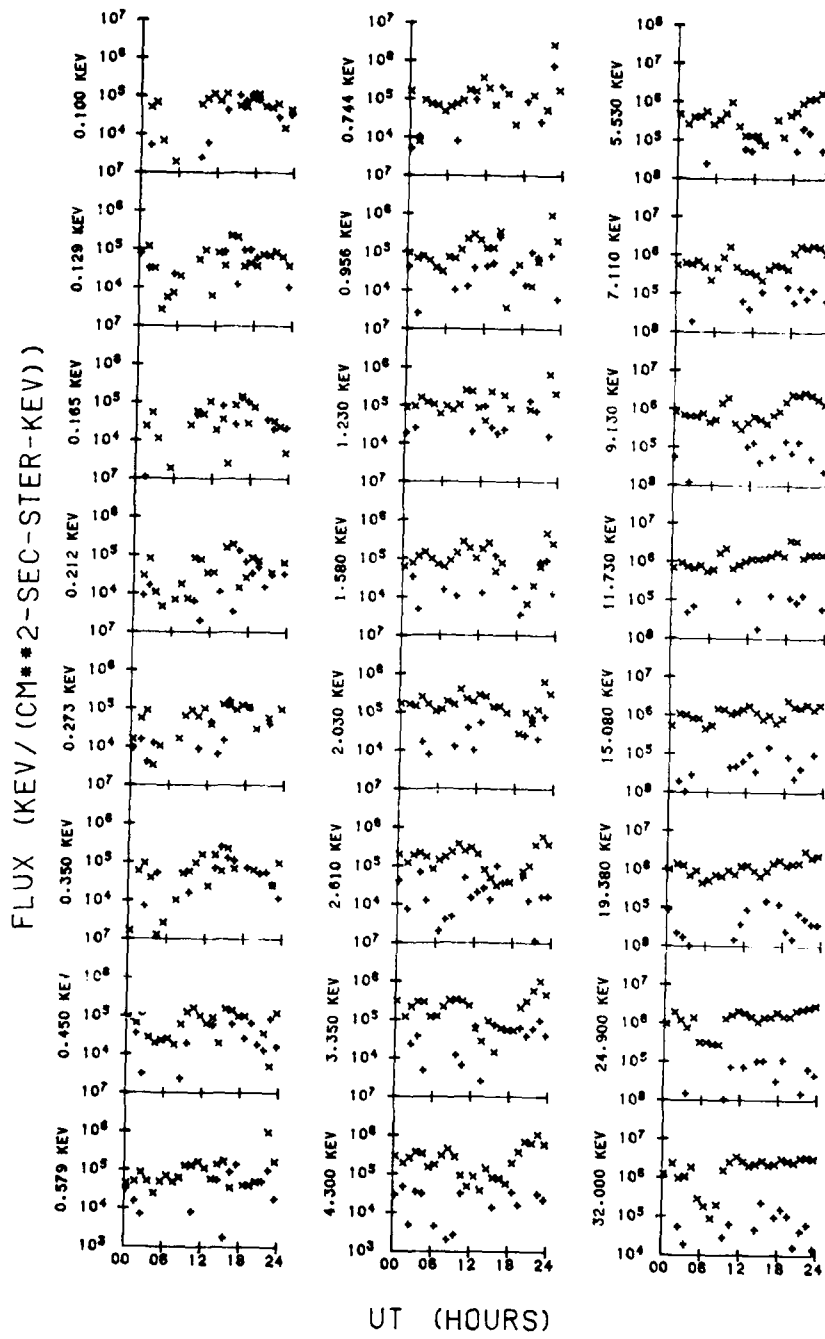
X HYDROGEN
+ OXYGEN



DAY 194

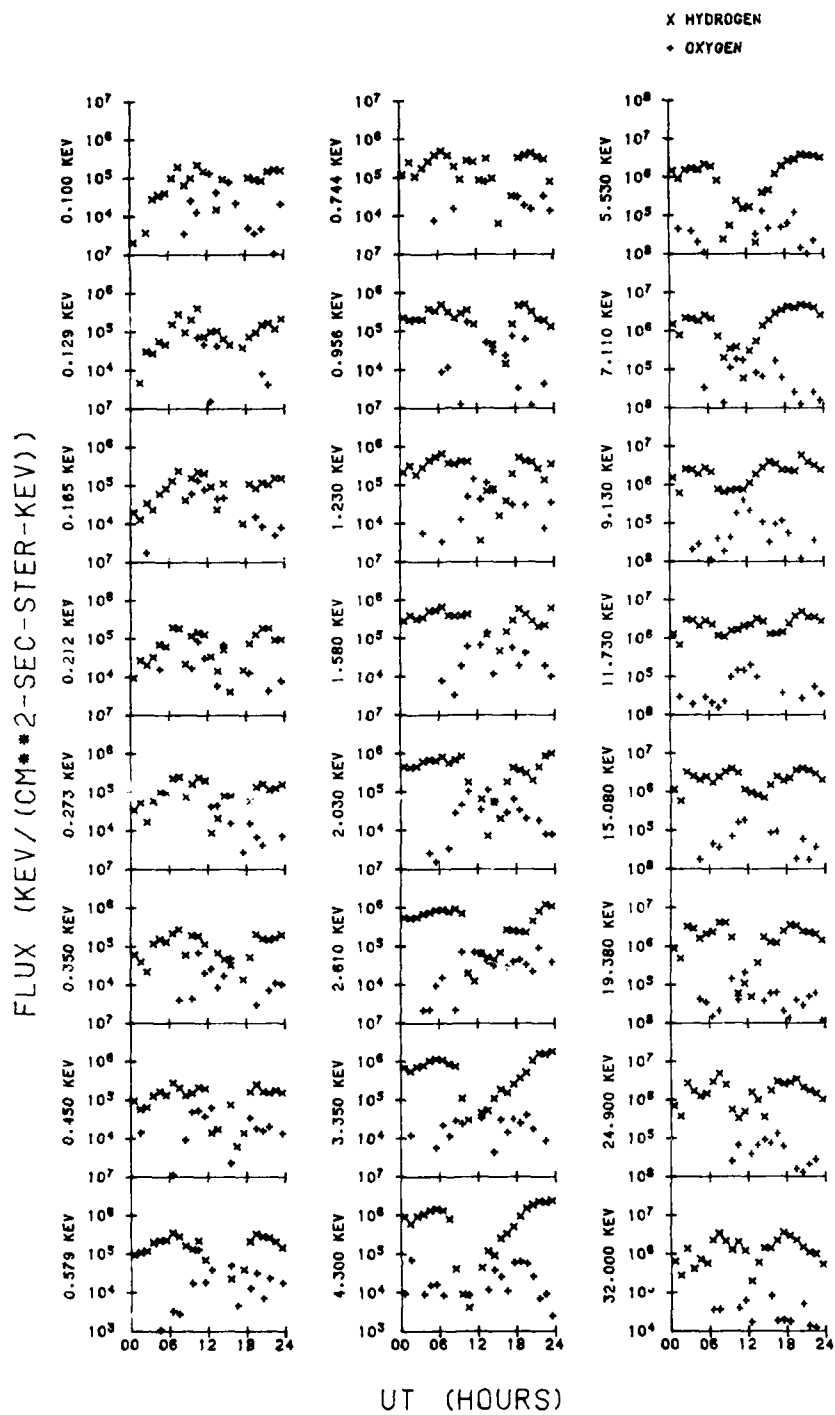
IONS

X HYDROGEN
+ OXYGEN



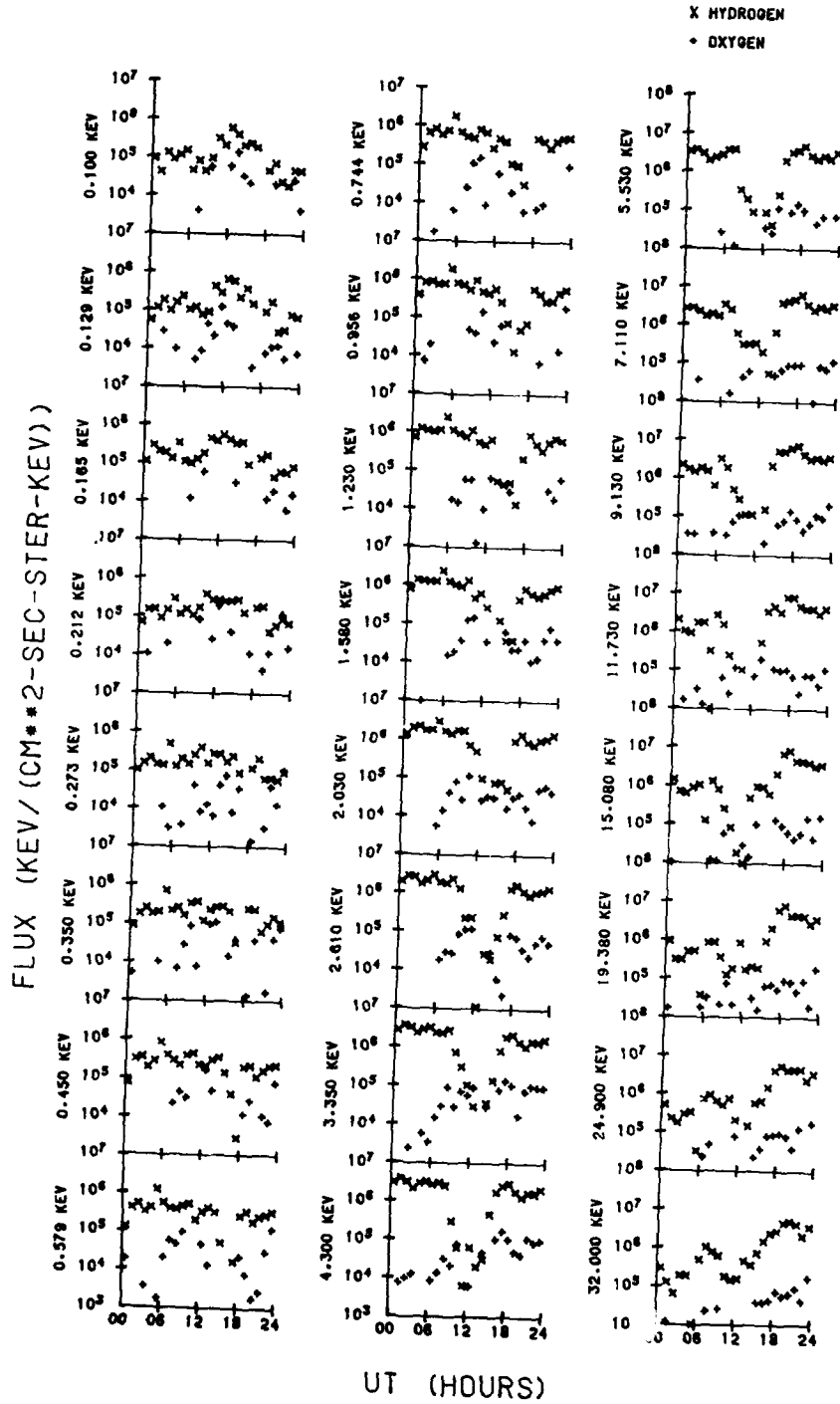
DAY 200

IONS



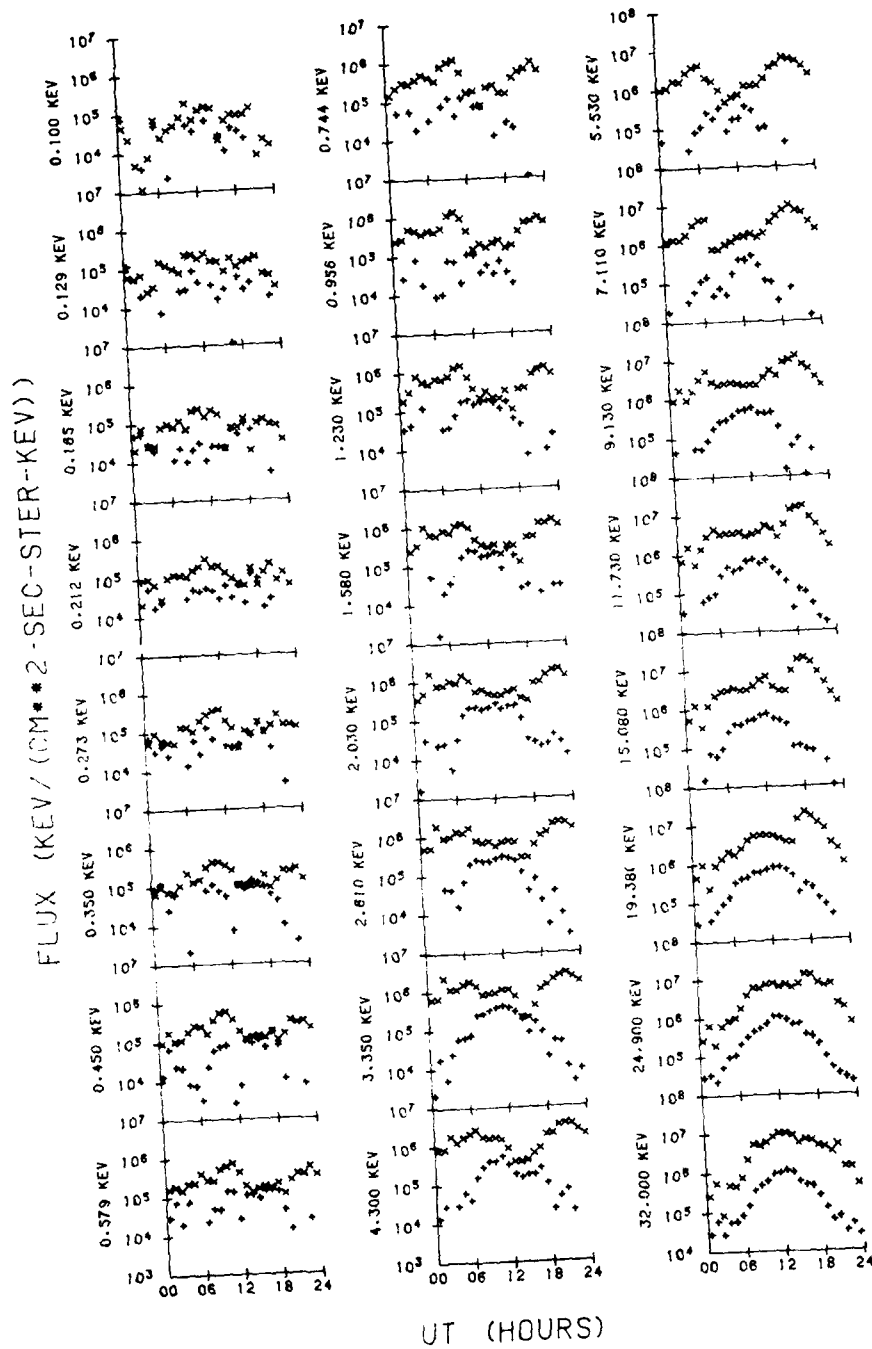
DAY 206

IONS



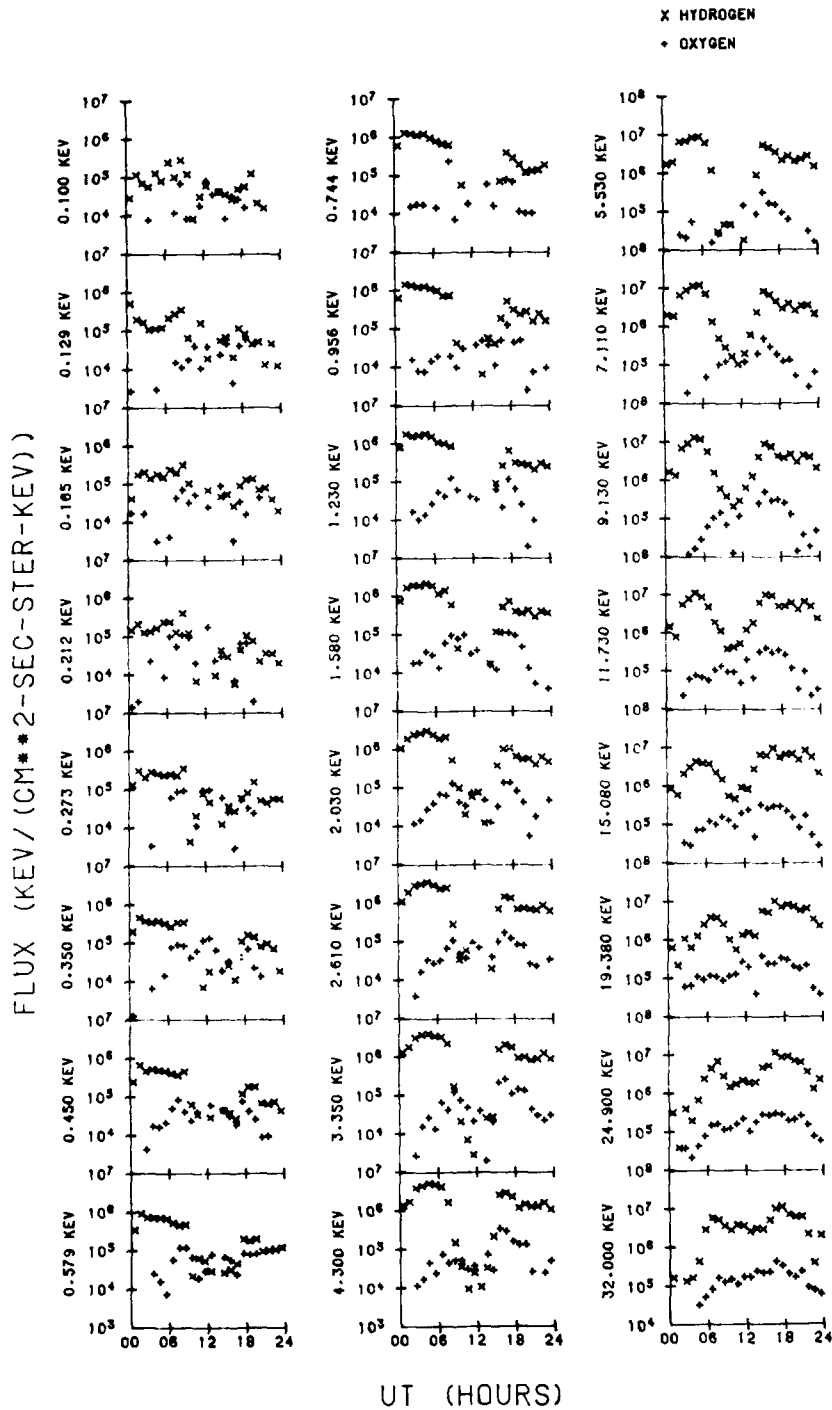
IONS

X HYDROGEN
+ OXYGEN



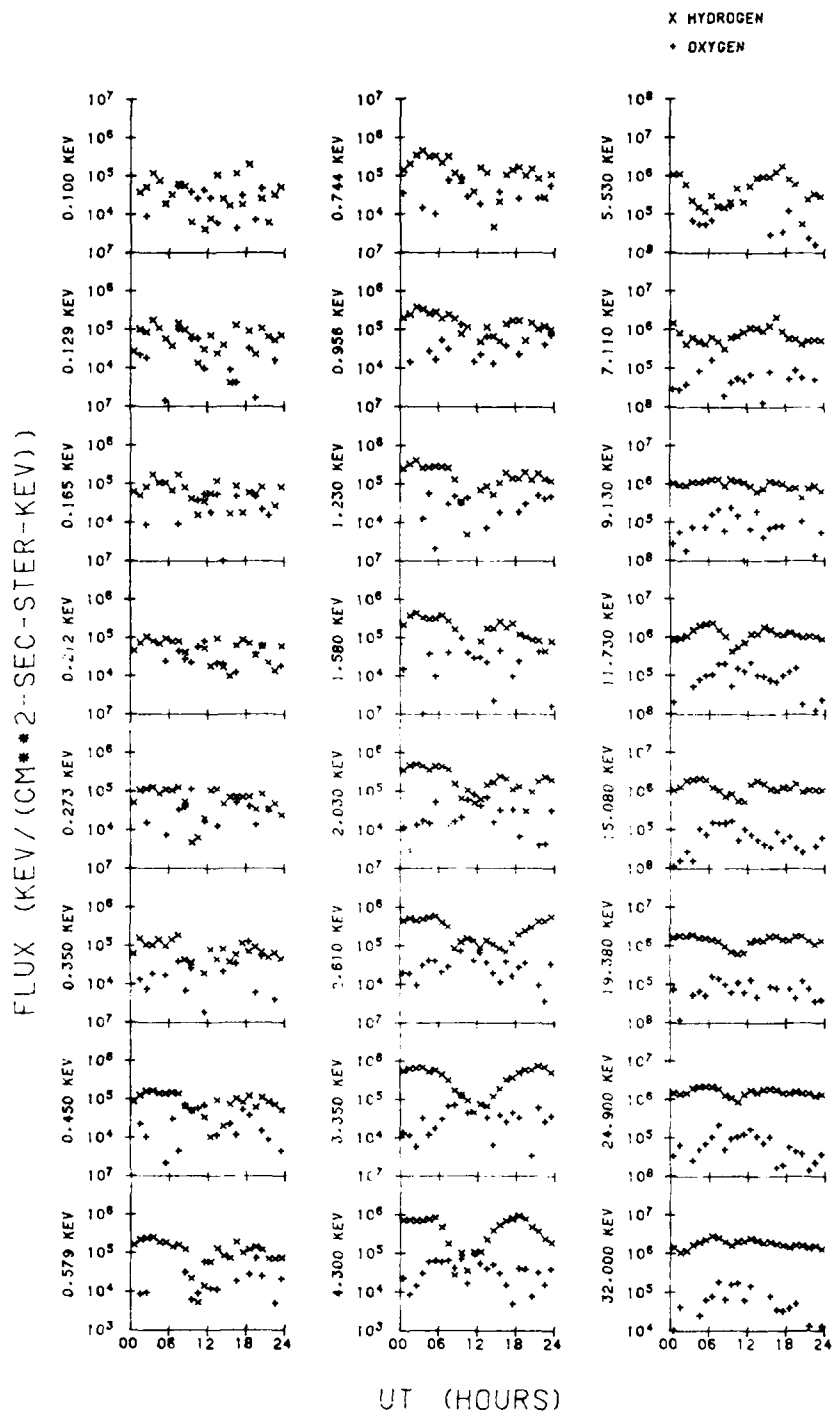
DAY 208

IONS

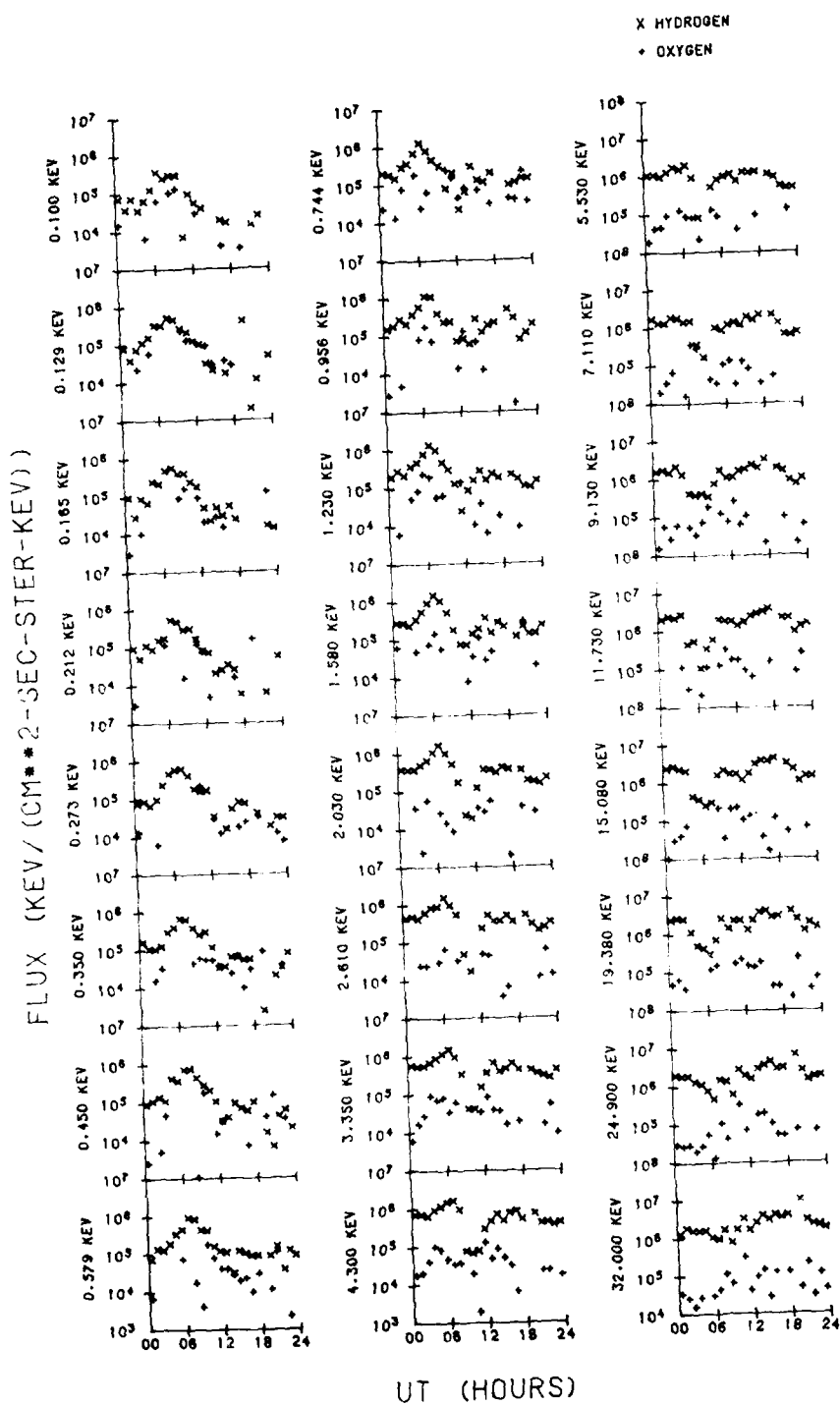


DAY 210

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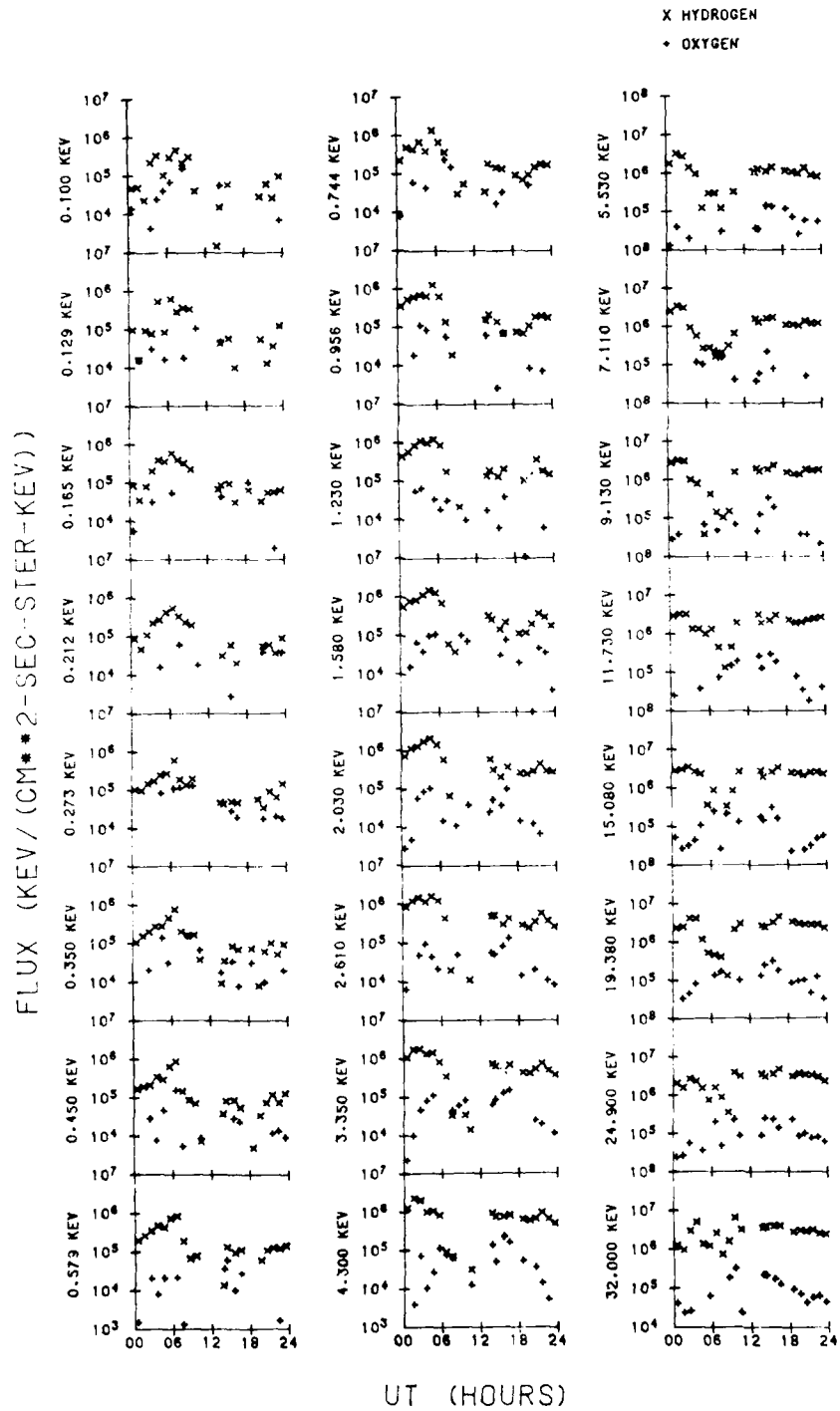


IONS



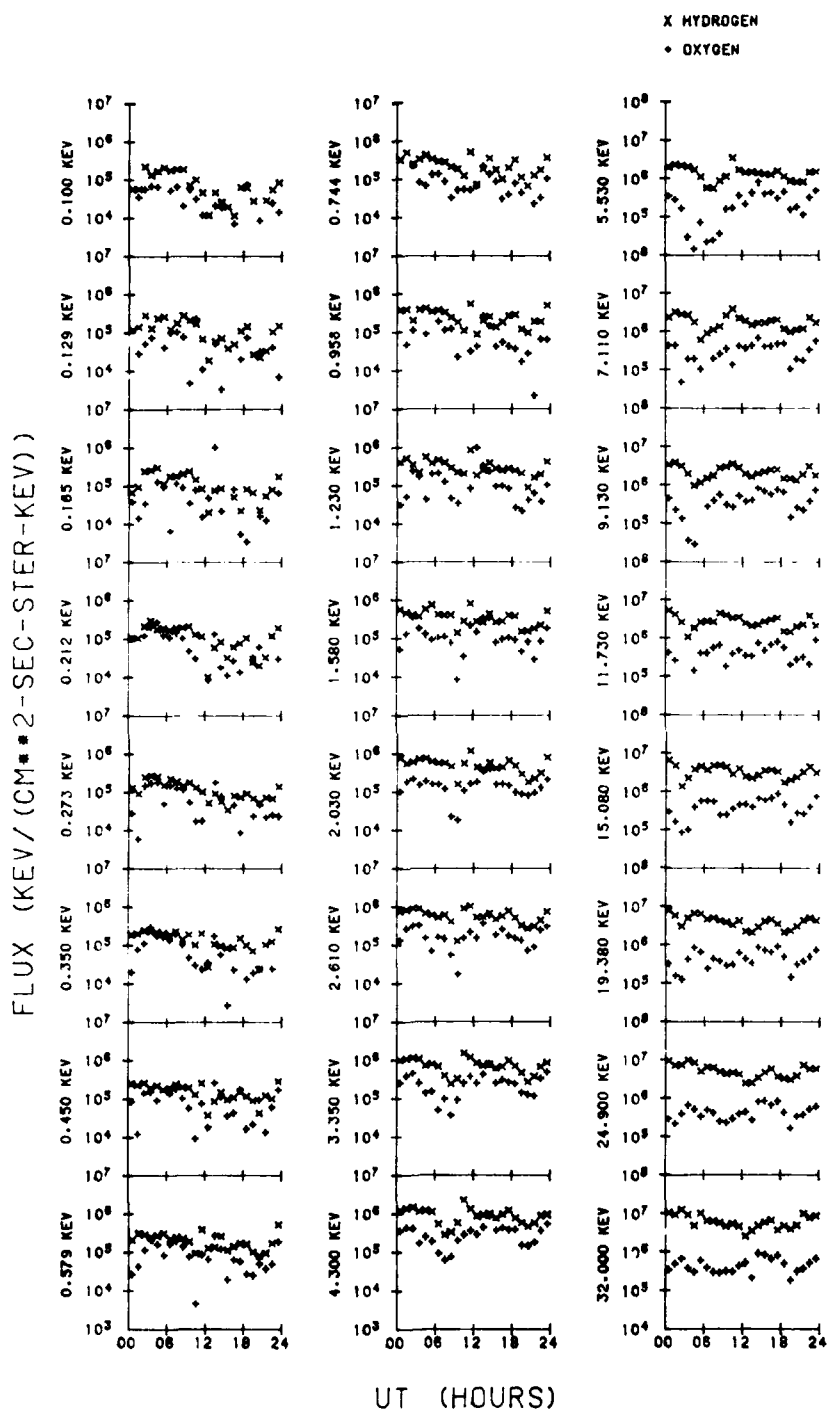
DAY 216

IONS



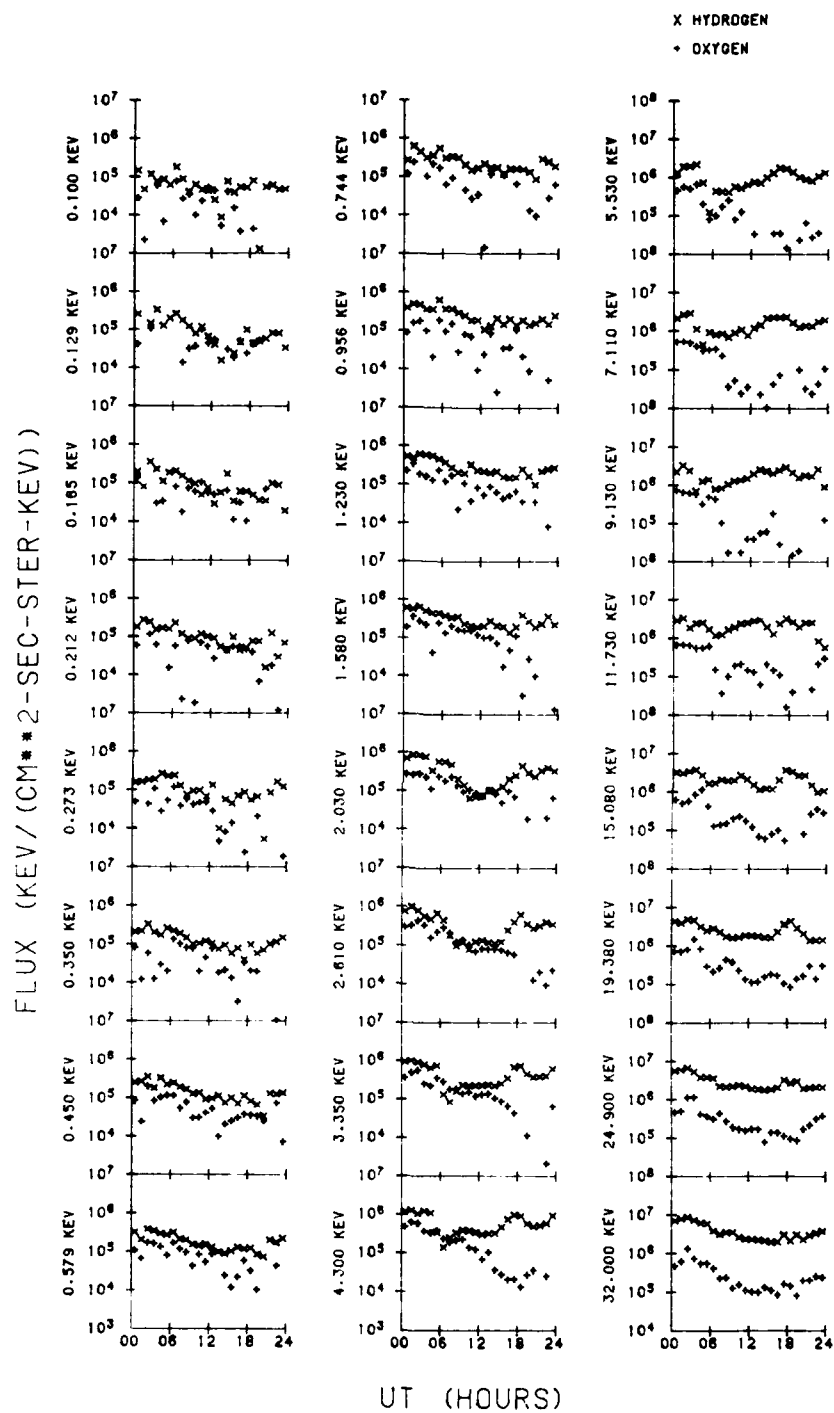
DAY 218

IONS

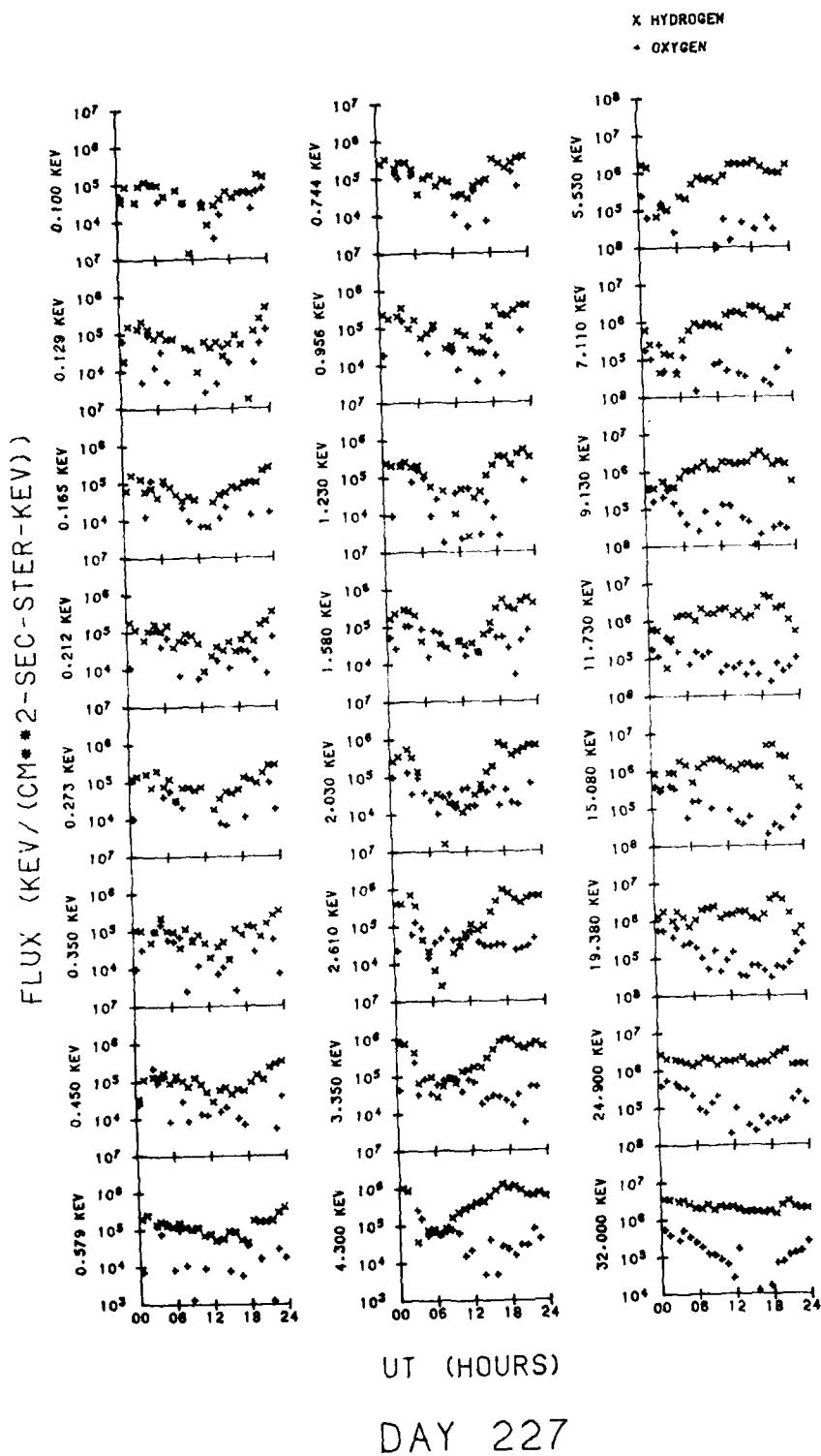


DAY 225

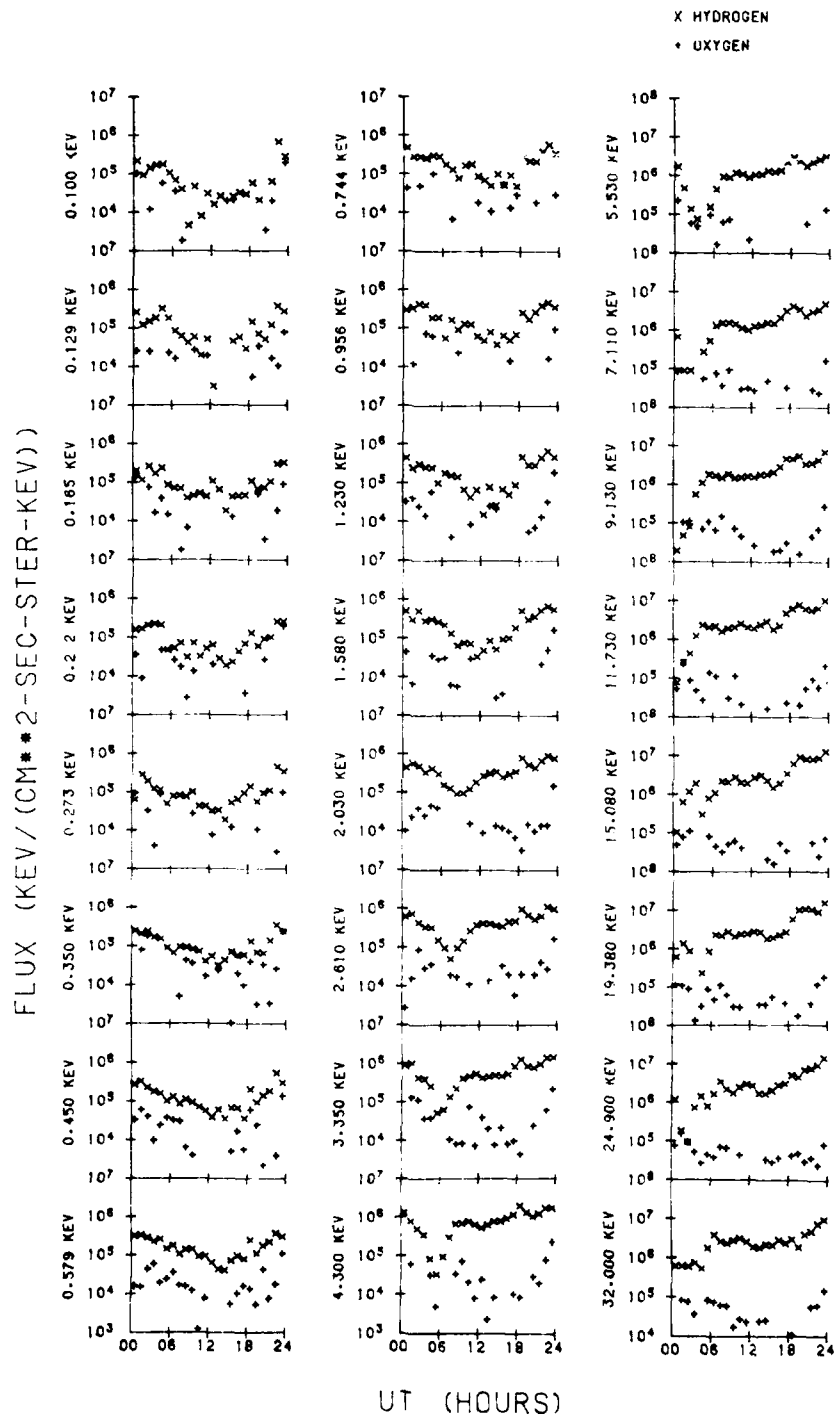
IONS



IONS

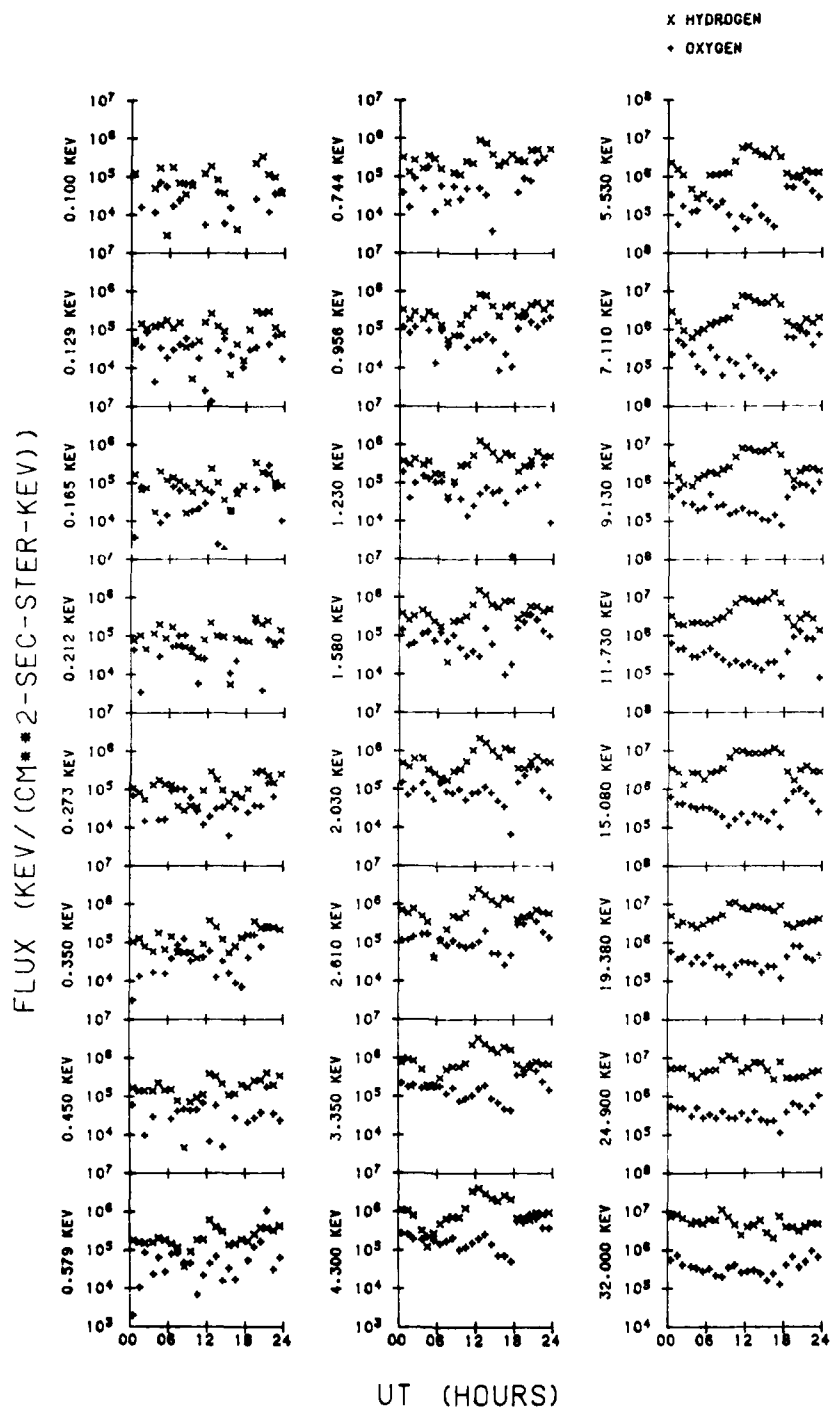


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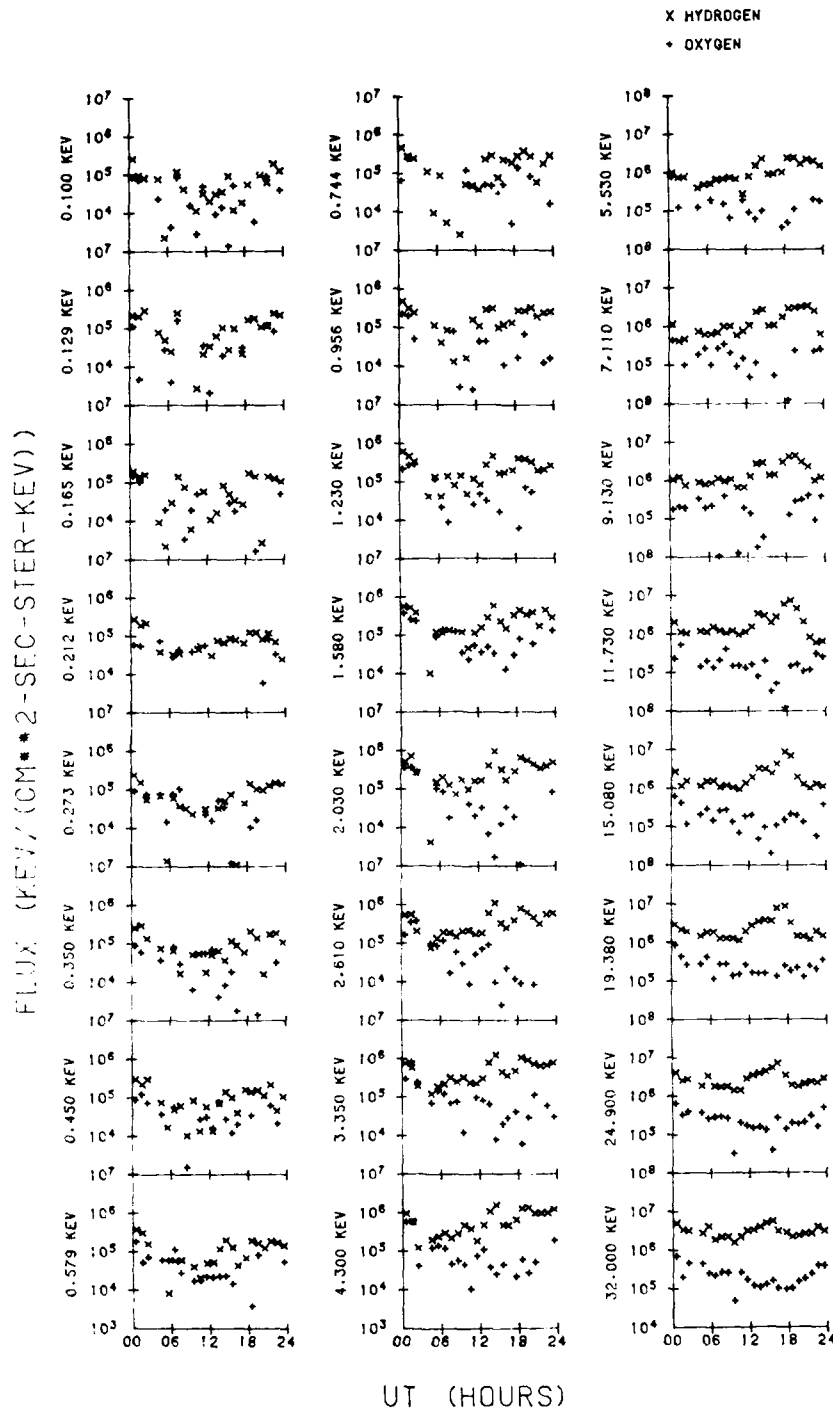


DAY 230

IONS



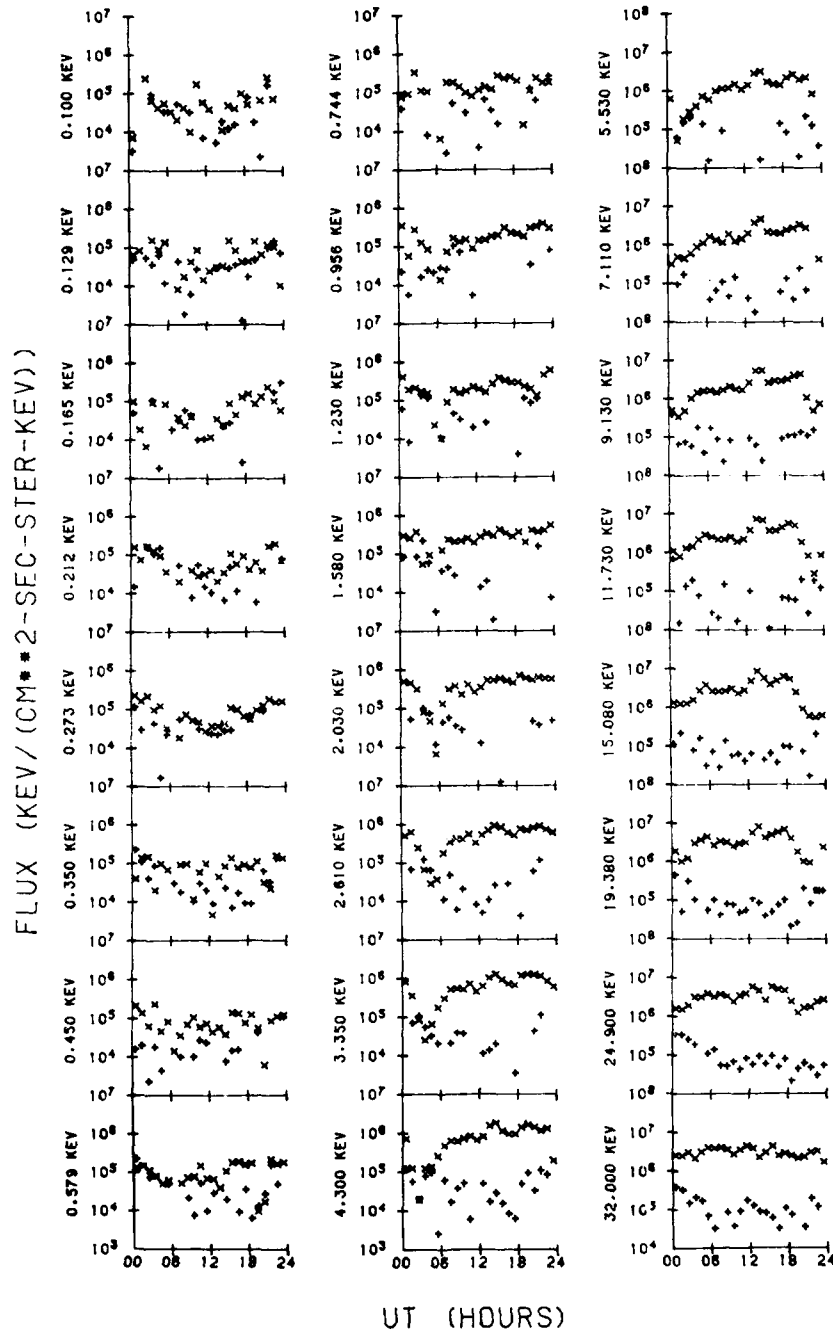
IONS



DAY 233

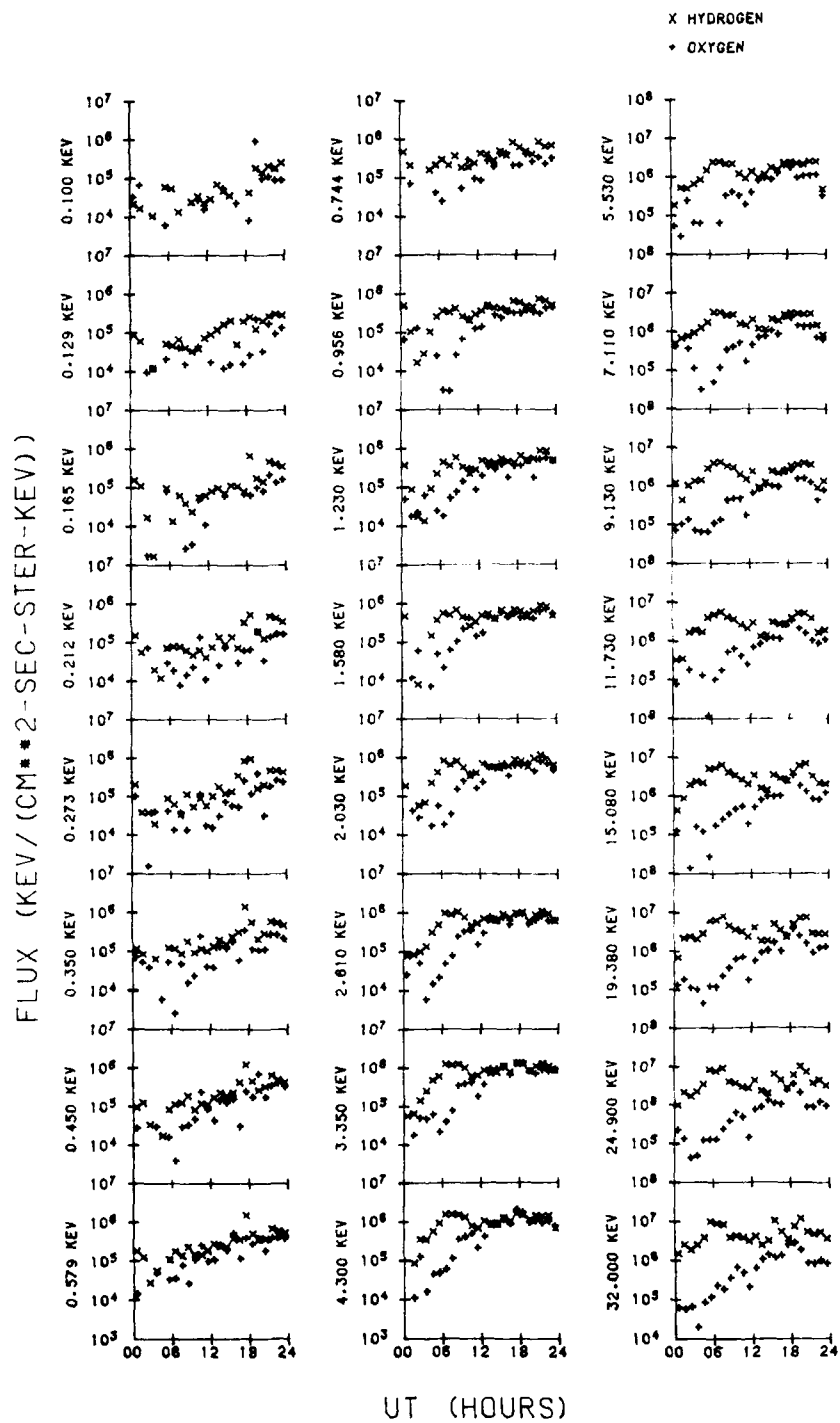
IONS

X HYDROGEN
+ OXYGEN



DAY 234

IONS



DAY 241

7. MIDDLE ENERGY ELECTRON AND ION DATA BASE, SC5

7.1 Instrument Description

The Air Force Geophysics Laboratory SC5 Rapid Scan Particle Detector, built and operated under the direction of D.A. Hardy, measures fluxes of electrons and ions in the energy ranges from 50 eV to 1 MeV and from 50 eV to 7 MeV, respectively. These energies are the central energies of the channels. A complete spectrum is returned for the entire energy range in each 1 s interval, but the energy resolution is low, nearly 100%. The instrument consists of two sets of detectors. One set is mounted with the look direction oriented parallel to the spin axis, and the other set perpendicular to the spin axis. Each set of detectors consists of two cylindrical plate electrostatic analyzers (ESA) with spiraltron electron multipliers and two silicon surface barrier solid-state detector telescopes.

The two low- (high-) energy ESAs measure the electron and ion fluxes in four contiguous channels that range from 100 eV to 1.7 keV and from 1.7 to 60 keV, respectively. Both sets of ESAs also measure a background channel with zero voltage on the deflection plate. The low-energy ESAs have geometric factors of $1 \times 10^{-4} \text{ cm}^2 \text{ sr}$ for both ions and electrons. The high-energy ESAs have geometric factors of $3 \times 10^{-5} \text{ cm}^2 \text{ sr}$ for electrons and $3 \times 10^{-4} \text{ cm}^2 \text{ sr}$ for ions. The solid state spectrometers (SSSs) make both anticoincident and coincident measurements. Here we use only the anticoincidence channels that measure particles between 70 and 400 keV. The electron SSSs use a 0.1 mil aluminum foil to absorb light and protons below 250 keV and have a $3 \times 10^{-4} \text{ m}$ -thick front detector. The proton SSSs use a sweeping magnet to eliminate electrons below about 200 keV and have an $6 \times 10^{-6} \text{ m}$ -thick front detector with 120 mg/cm² of aluminum for a light shield. The front detectors, in anticoincidence with the rear detectors, measure the particle fluxes over the energies studied. A full description of the instrument and its calibration can be found in Hanser, et al.⁸

7.2 Description of Data Presentation; SC5 Middle Energy Electrons and Ions

In each Figure are plotted ten minute averages of the number flux in $(\text{cm}^2 \text{ s sr eV})^{-1}$ of electrons (left hand panel) and ions (right hand panel) for selected energies as a function of Universal Time for a 24-hour period. The number flux scale is logarithmic. The detectors used to create these averages are those perpendicular to the satellite spin axis. In each plot the averages are performed for fluxes that are most parallel (+') and perpendicular (X's) to the magnetic field. The satellite spin axis is such that fluxes within 15° of the field line are usually measured. Data gaps occur when the detectors were operated in single energy, high data rate modes, or turned off during beam operations.

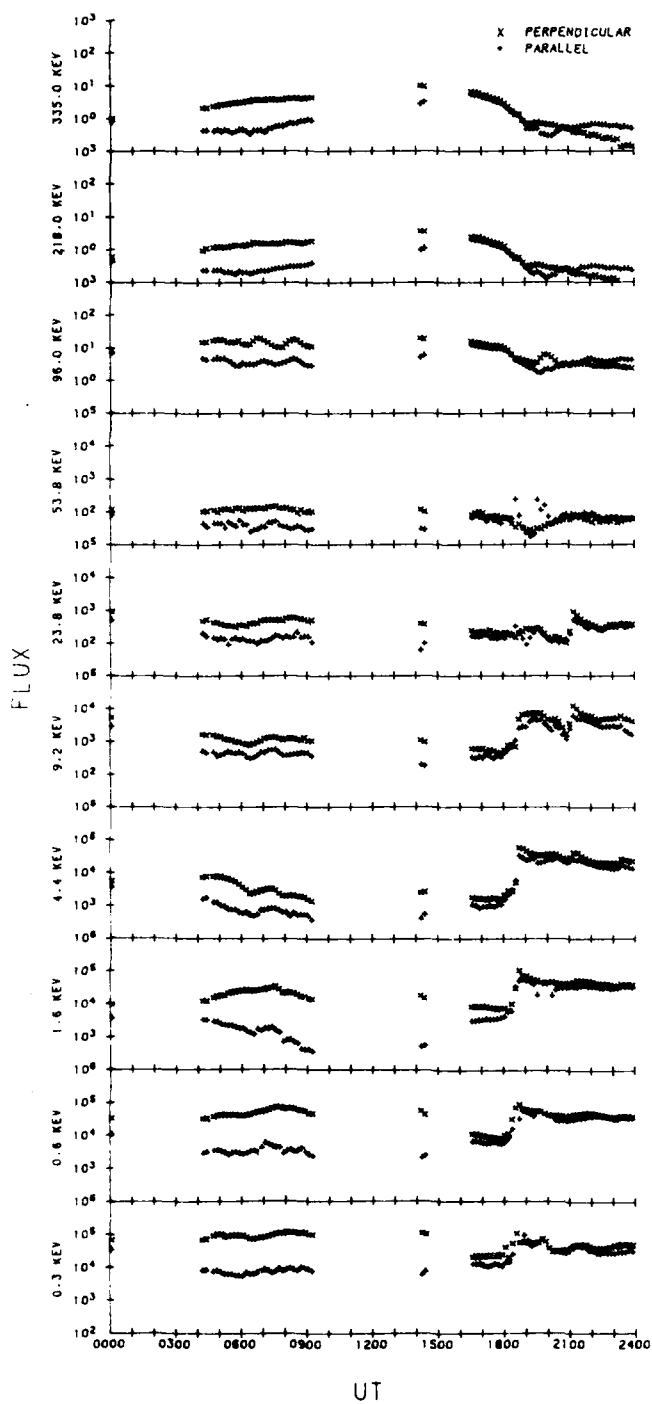
⁸Hanser, F.A., Hardy, D.A. and Sellers, B. (1979) *Calibration of the Rapid Scan Particle Detector Mounted in the SCATHA Satellite*, AFGL-TR-79-167, AD A082382.

7.3 Calendar of Days for which SC5 Middle Energy Electron and Ion Data are Presented

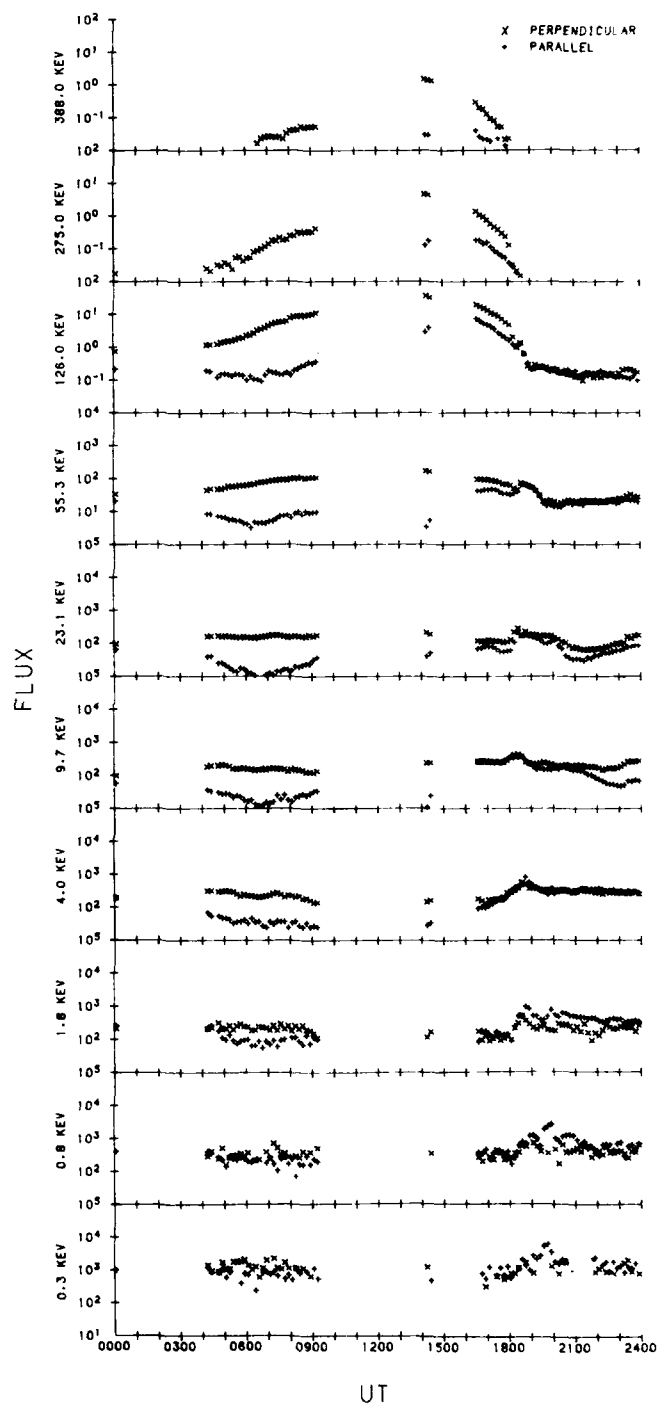
| 1979 | | | | | | | | | | | | 1980 | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|------|-----|-----|
| DAY | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | | JAN | FEB | DAY |
| 1 | | | 121 | | | | | | | | | | | 1 |
| 2 | | | 122 | | | | | | | | | | | 2 |
| 3 | | | | | | | | | | | | | | 3 |
| 4 | | | | | | | | | | | | | | 4 |
| 5 | | | | 156 | | | | | | | | 036 | | 5 |
| 6 | | 096 | | | | | | 279 | | | | | | 6 |
| 7 | | | 127 | | | | | | | | | | | 7 |
| 8 | | | | | | | | | | | | | | 8 |
| 9 | | | | | | | | | | | | | | 9 |
| 10 | | | | | | | | | | | | | | 10 |
| 11 | | | | | | | | | | | | 042 | | 11 |
| 12 | | | | | | | | | | | | | | 12 |
| 13 | | | | | | | | | | | | | | 13 |
| 14 | | | | | | | | | | | | | | 14 |
| 15 | | | | 166 | | 227 | | | | | | | | 15 |
| 16 | | | | | | | | | | | | | | 16 |
| 17 | | | | | | | | | | | | | | 17 |
| 18 | | | | | | | | | | | | 018 | | 18 |
| 19 | | | | | | | | | | | | | | 19 |
| 20 | | 110 | | | | | | | | | | | | 20 |
| 21 | 080 | 111 | | | | | | | | | | | | 21 |
| 22 | | 112 | 142 | | | | | 295 | | | | | | 22 |
| 23 | | 113 | | | | | | | | 357 | | | | 23 |
| 24 | | 114 | | | | | | | | | | | | 24 |
| 25 | | 115 | | | | | | | | 359 | | | | 25 |
| 26 | | 116 | | | | | | 299 | | | | | | 26 |
| 27 | | 117 | | | | | | 300 | | | | | | 27 |
| 28 | | 118 | | | | | 271 | | | | | | | 28 |
| 29 | | 119 | | 180 | | 241 | | | | 363 | | | | 29 |
| 30 | | 120 | | | | 242 | | | | | | | | 30 |
| 31 | | | | | | | | | | | | | | 31 |

7.4 Data Presentation; SC5 Middle Energy Electron and Ion Data

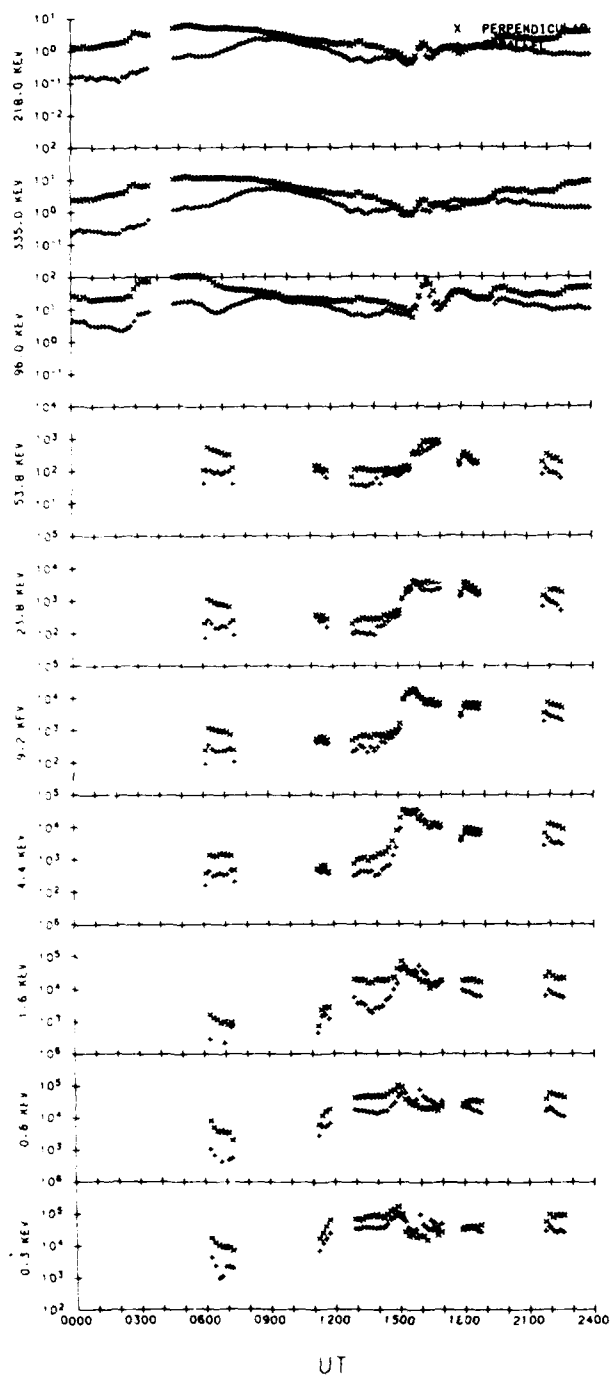
ELECTRONS
DAY 080



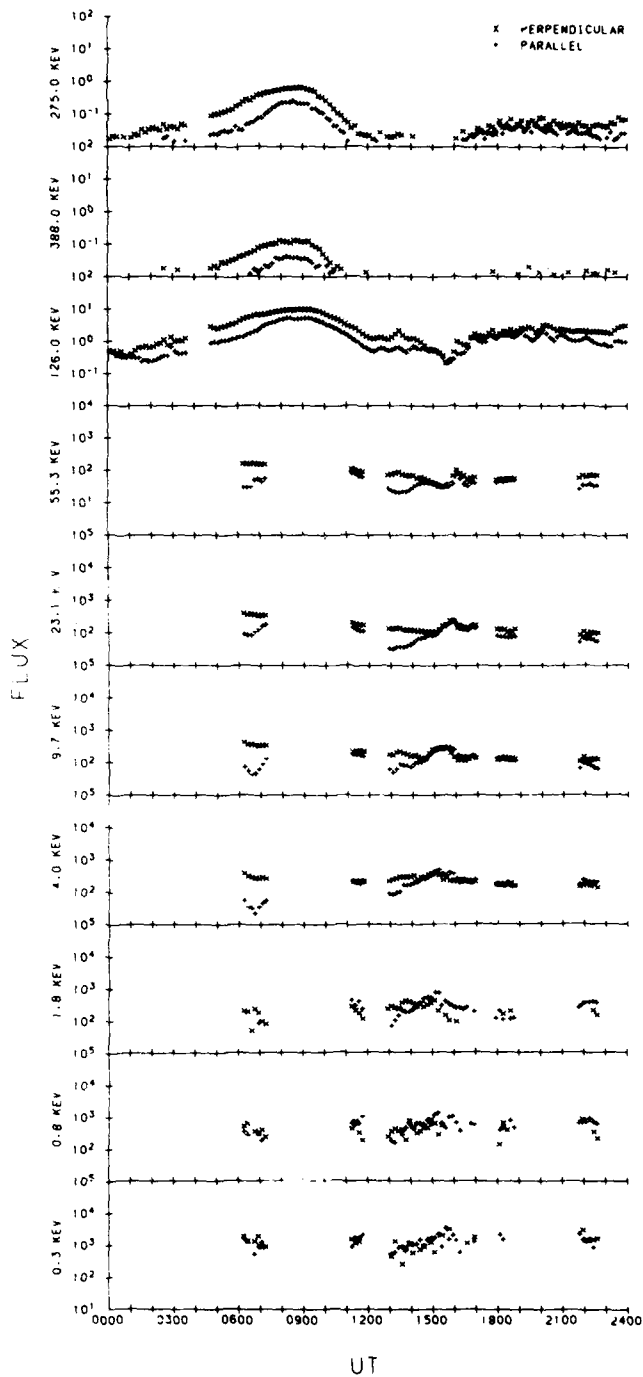
IONS
DAY 080



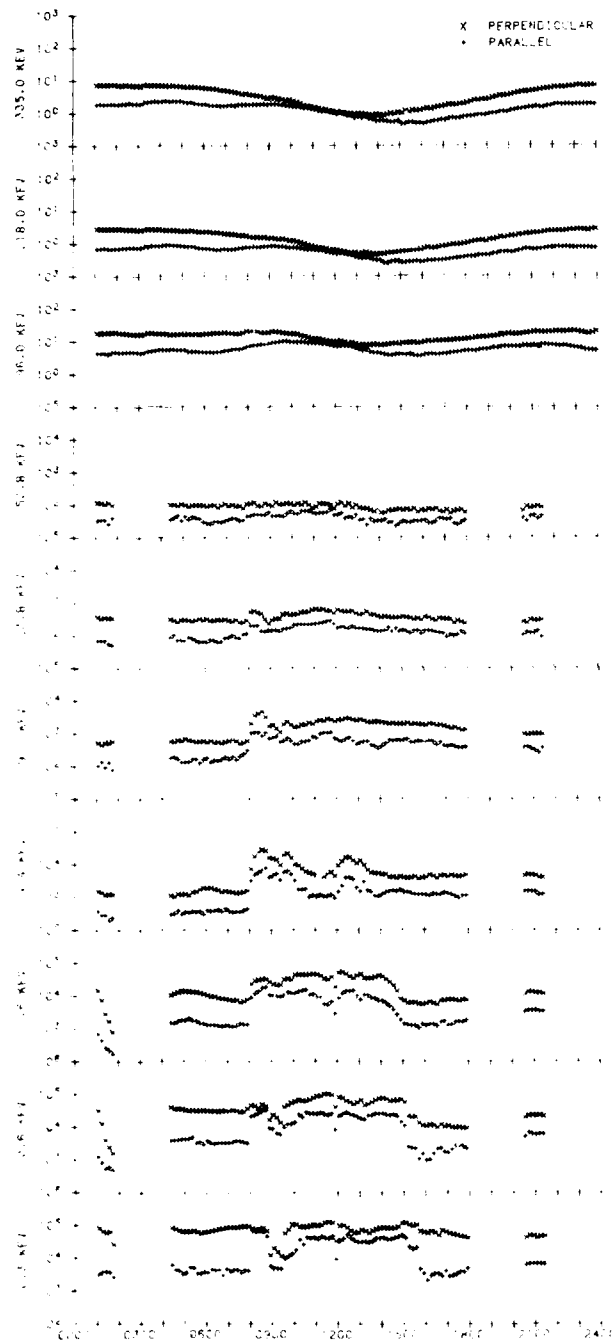
ELECTRONS DAY 096



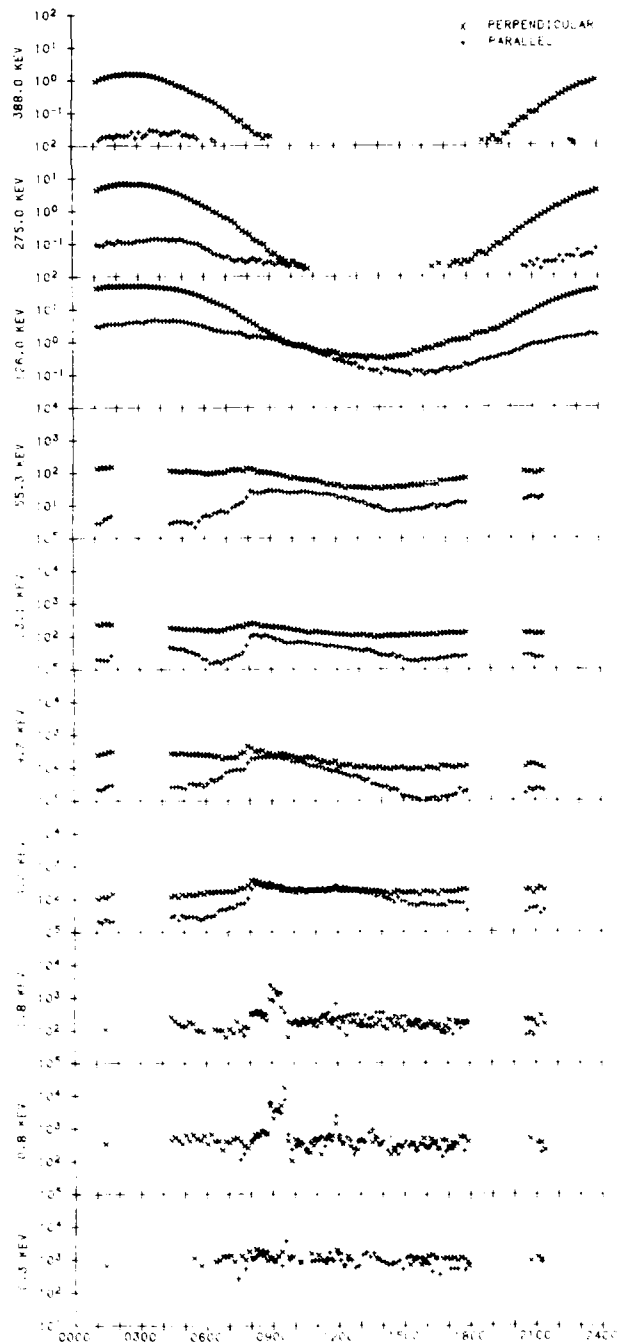
IONS DAY 096



ELECTRONS DAY 110

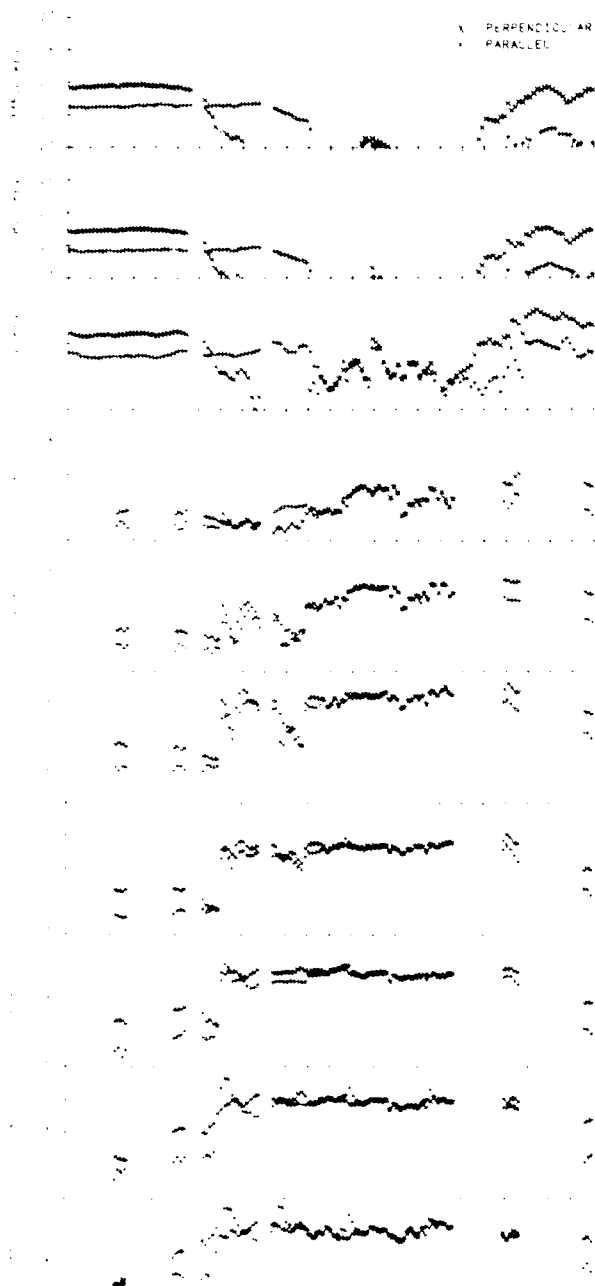


IONS DAY 110



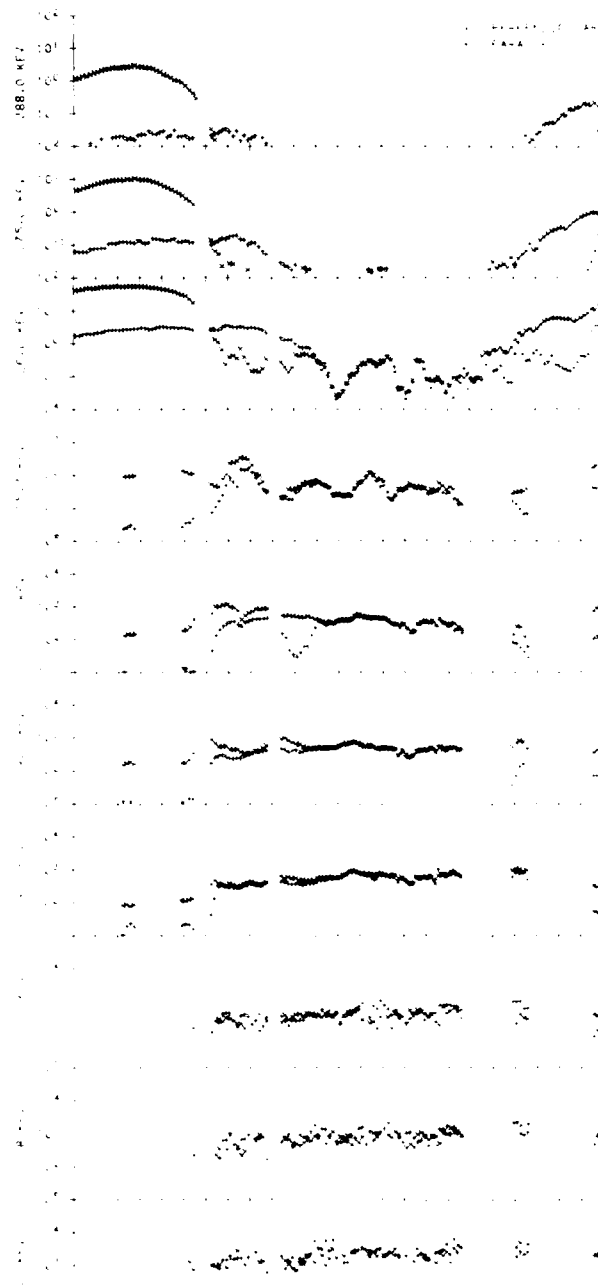
ELECTRONS

DAY 197

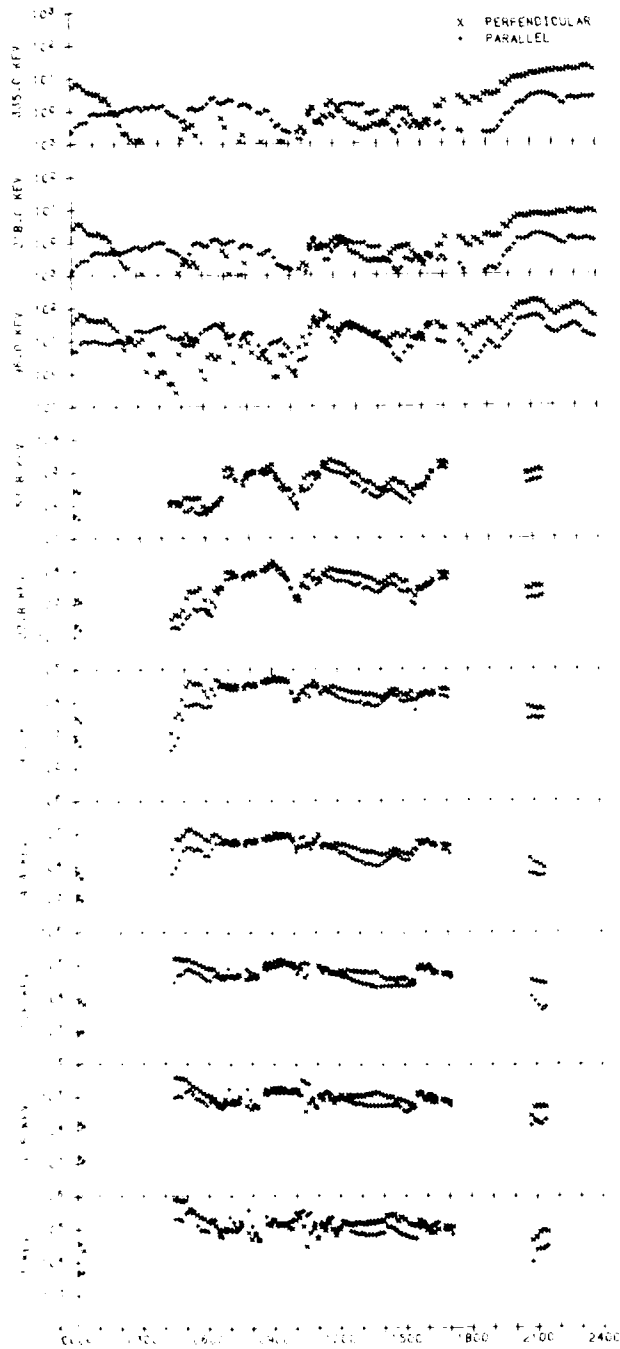


ELECTRONS

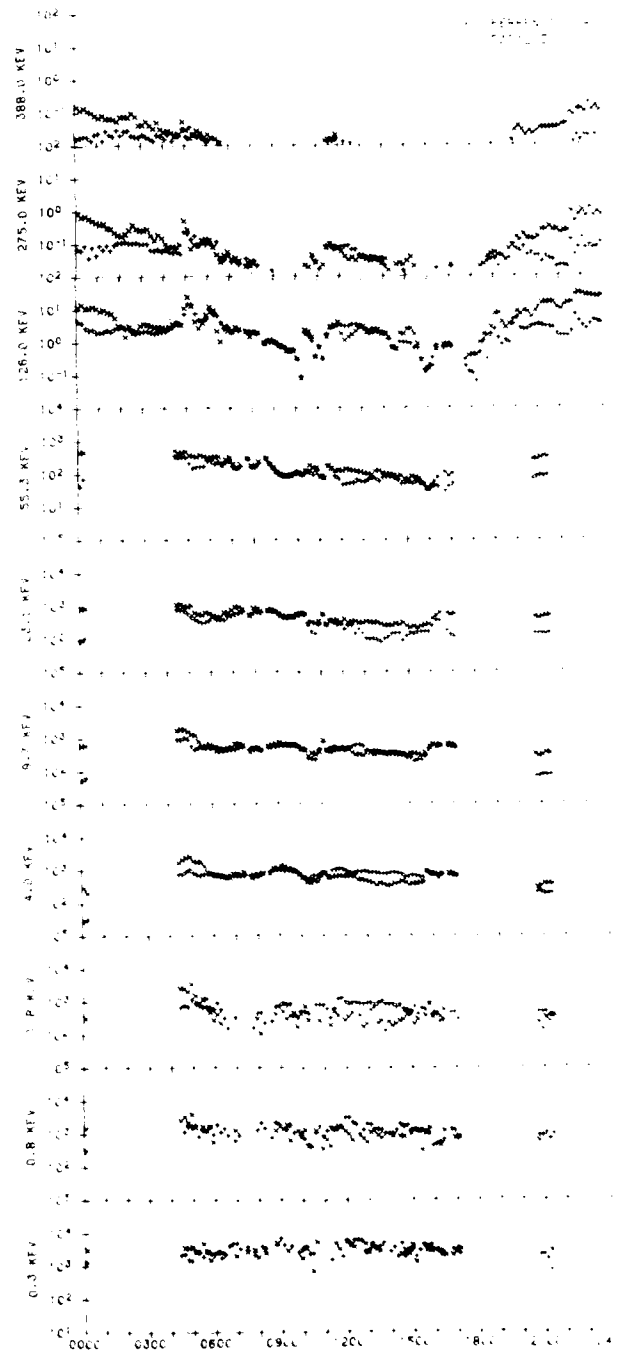
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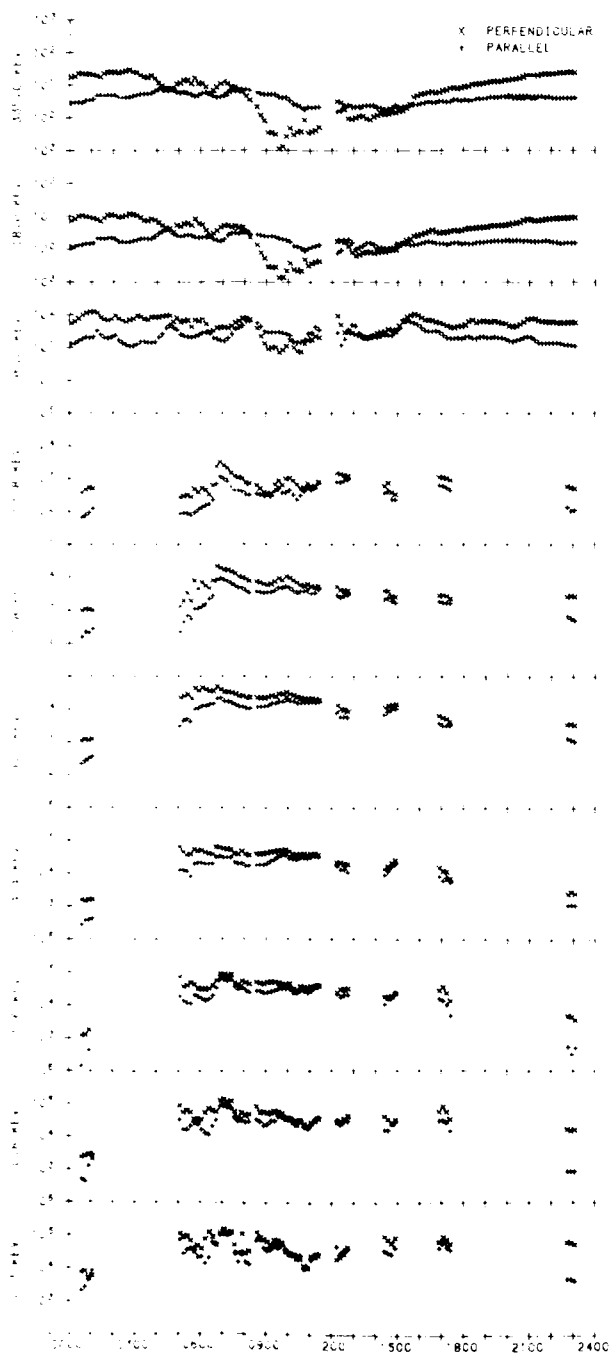
ELECTRONS
DAY 112



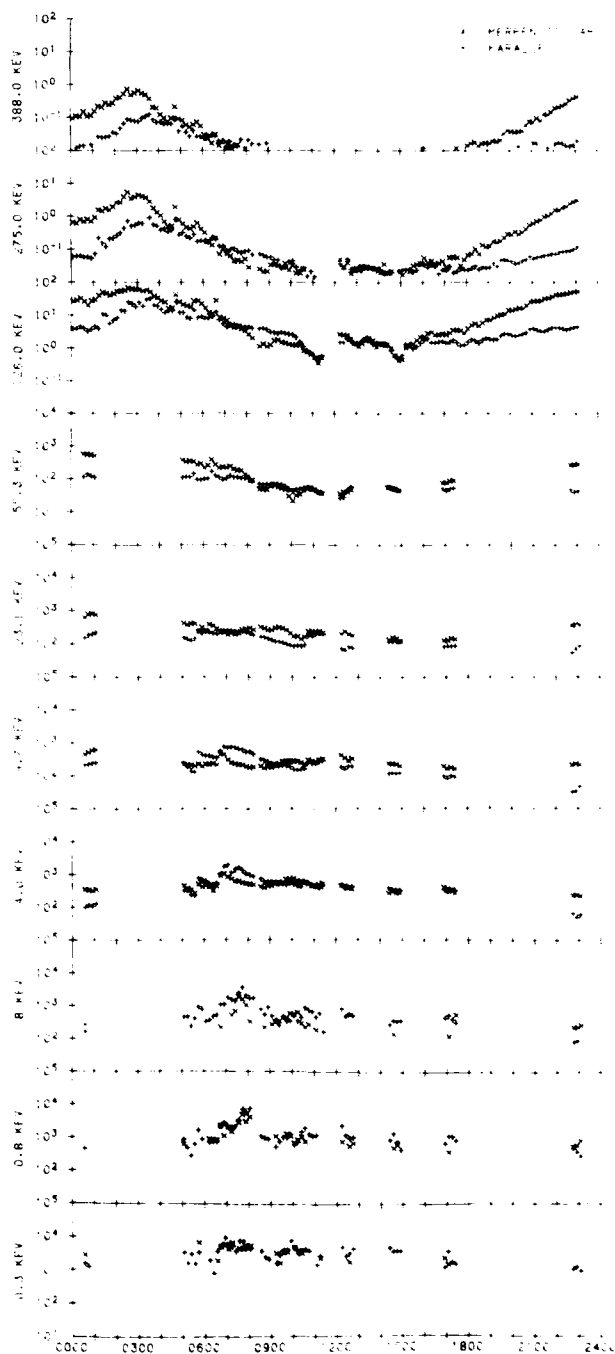
DAY 113
LATE



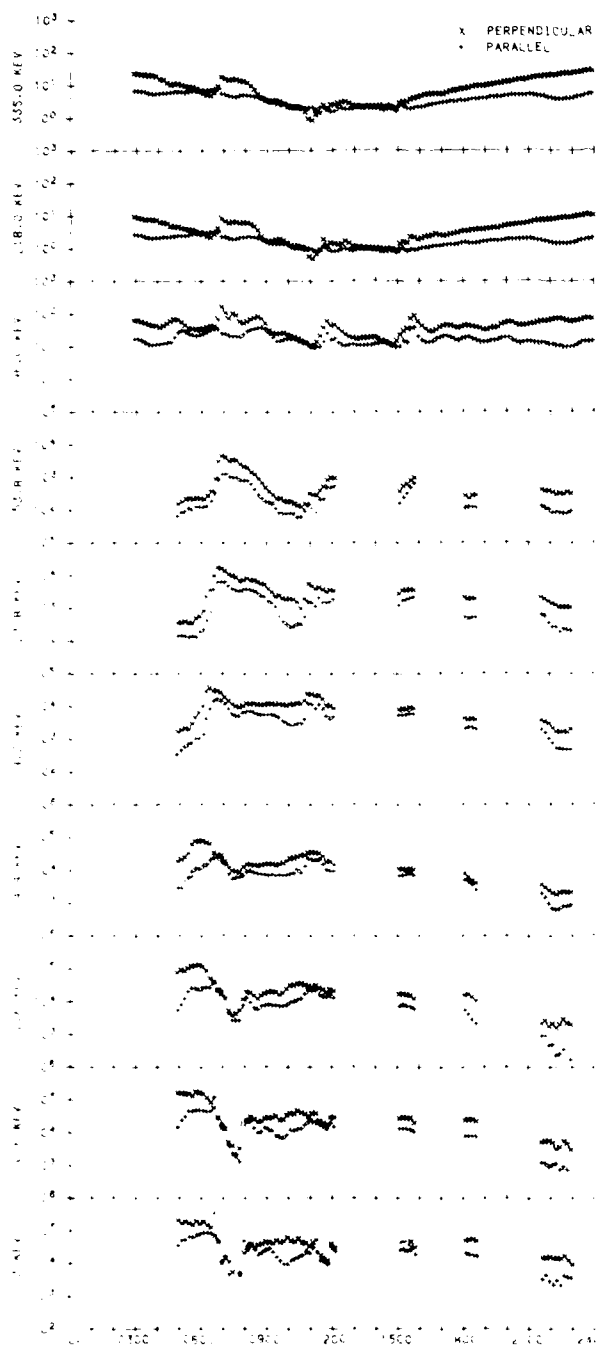
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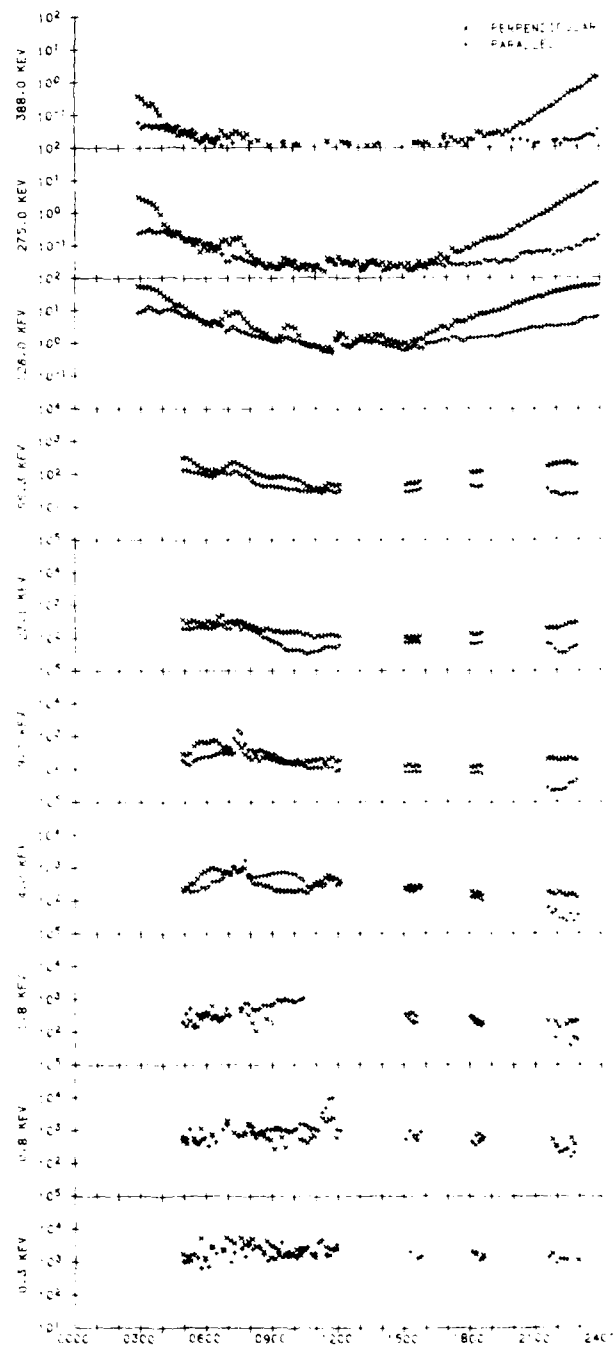
IONS DAY 113



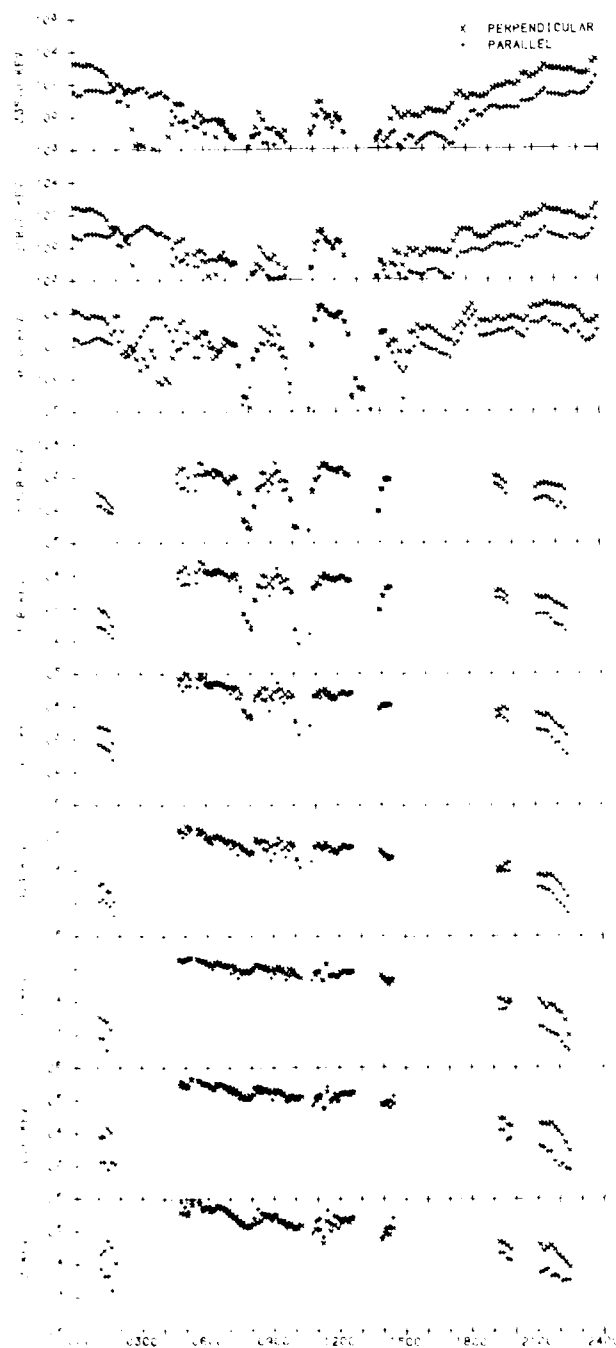
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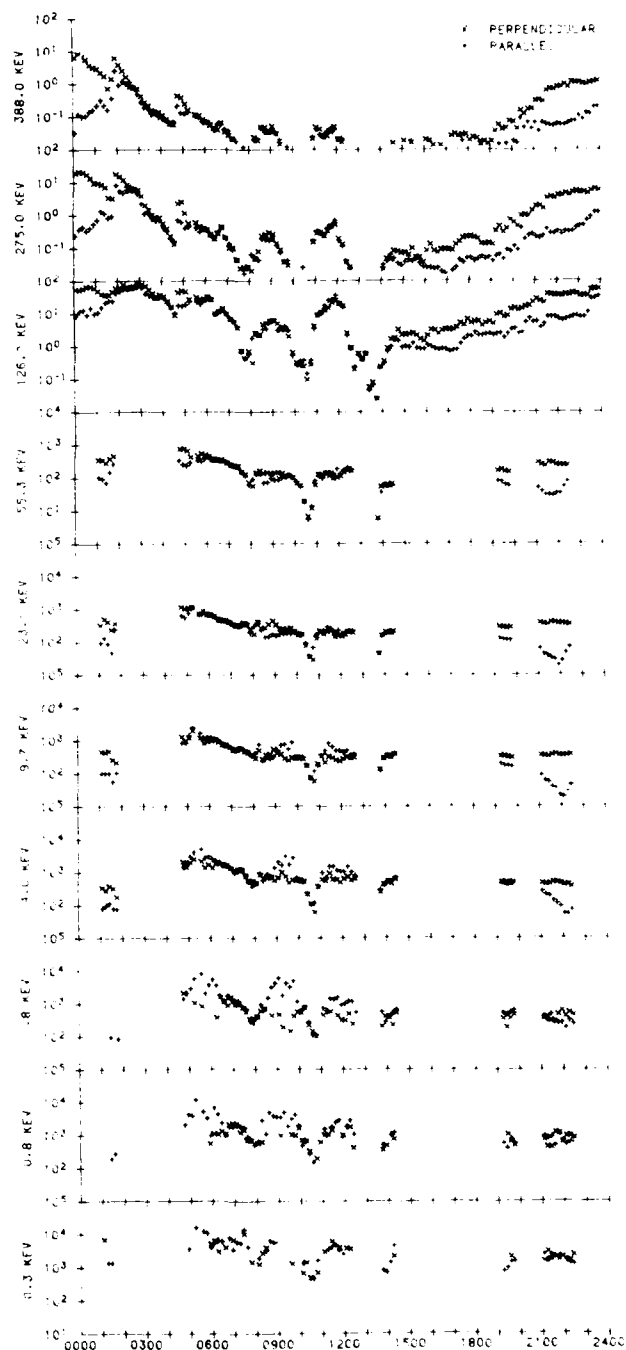
IONS DAY 114



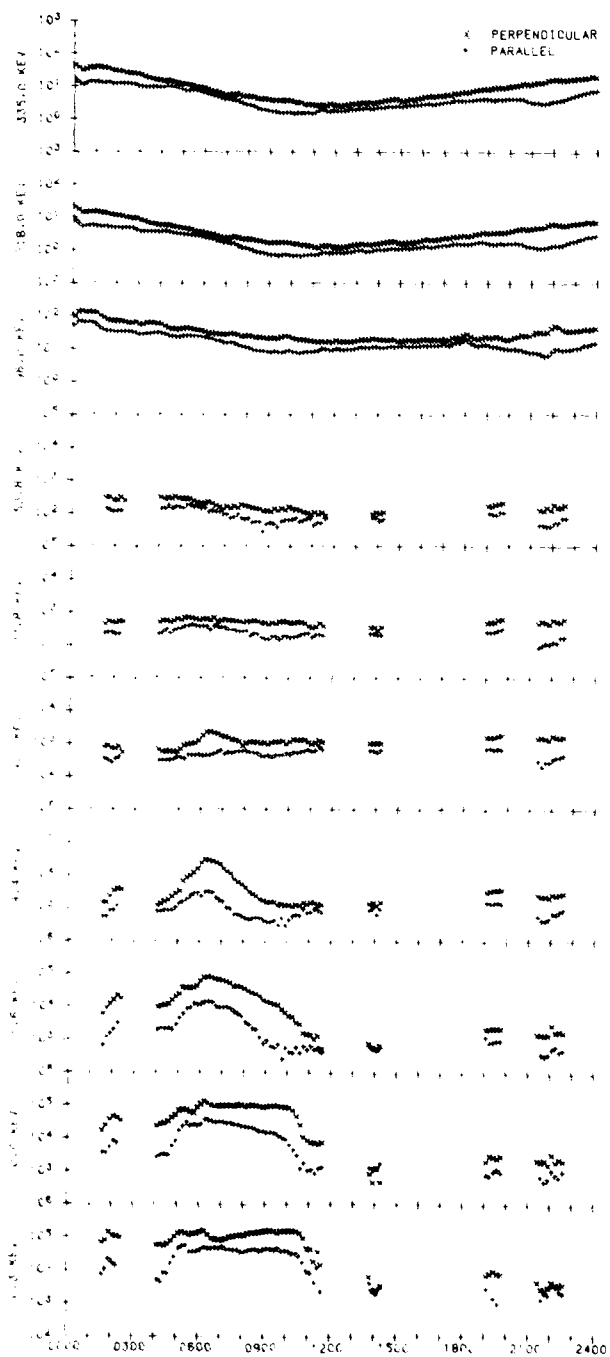
ELECTRONS DAY 115



IONS DAY 115

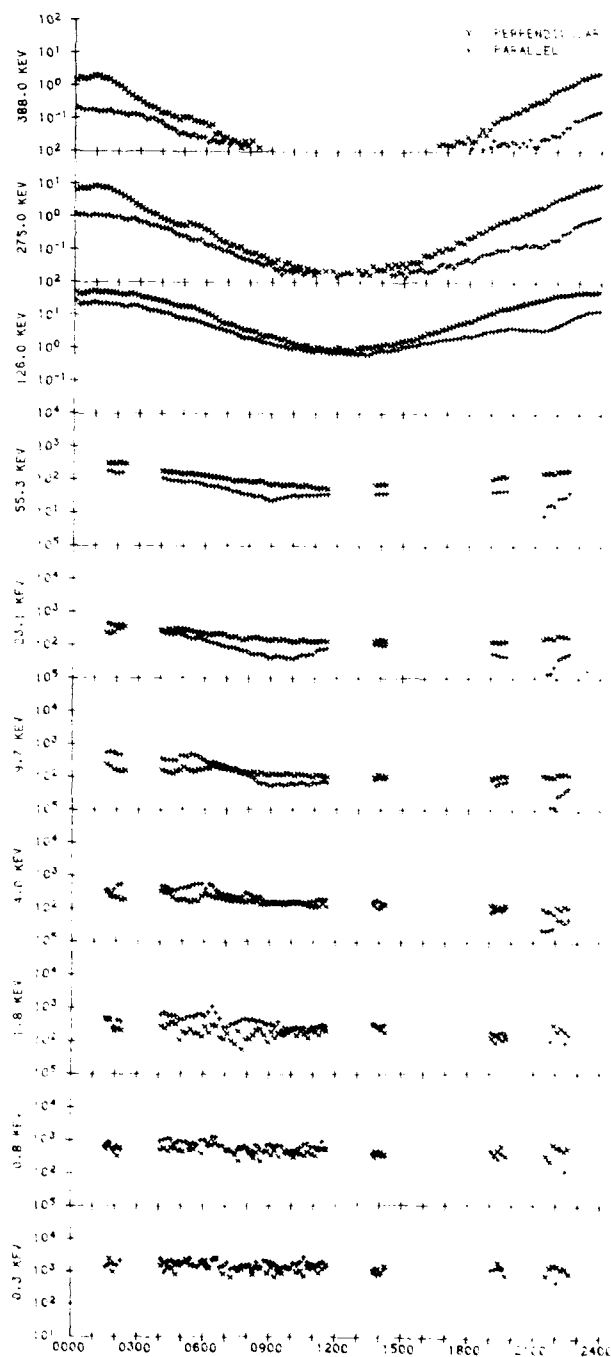


ELECTRONS DAY 116



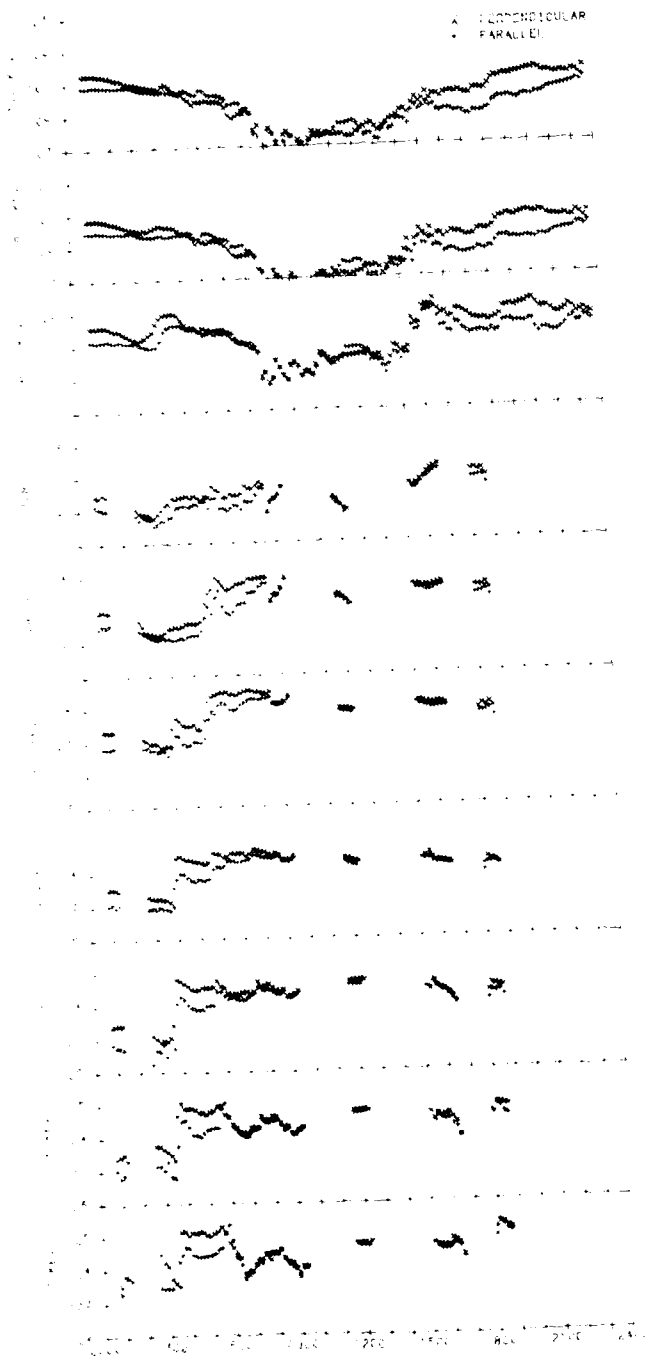
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IONS DAY 116

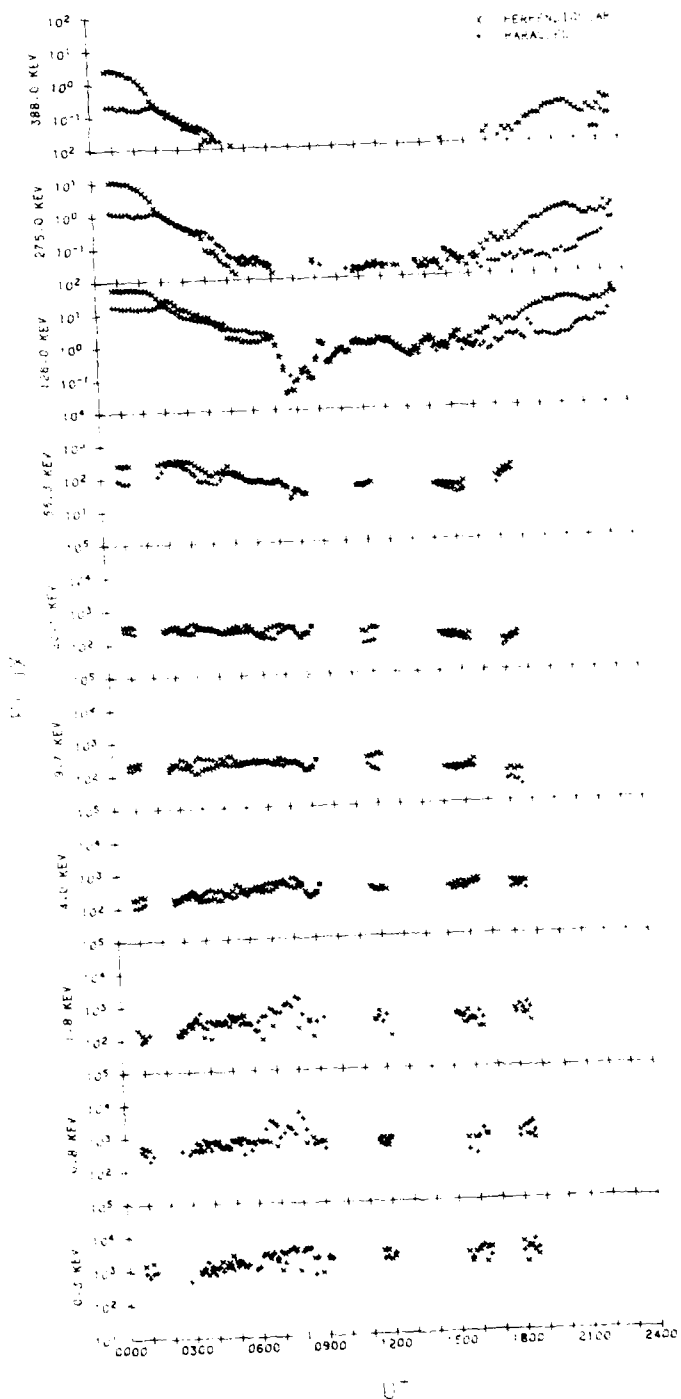


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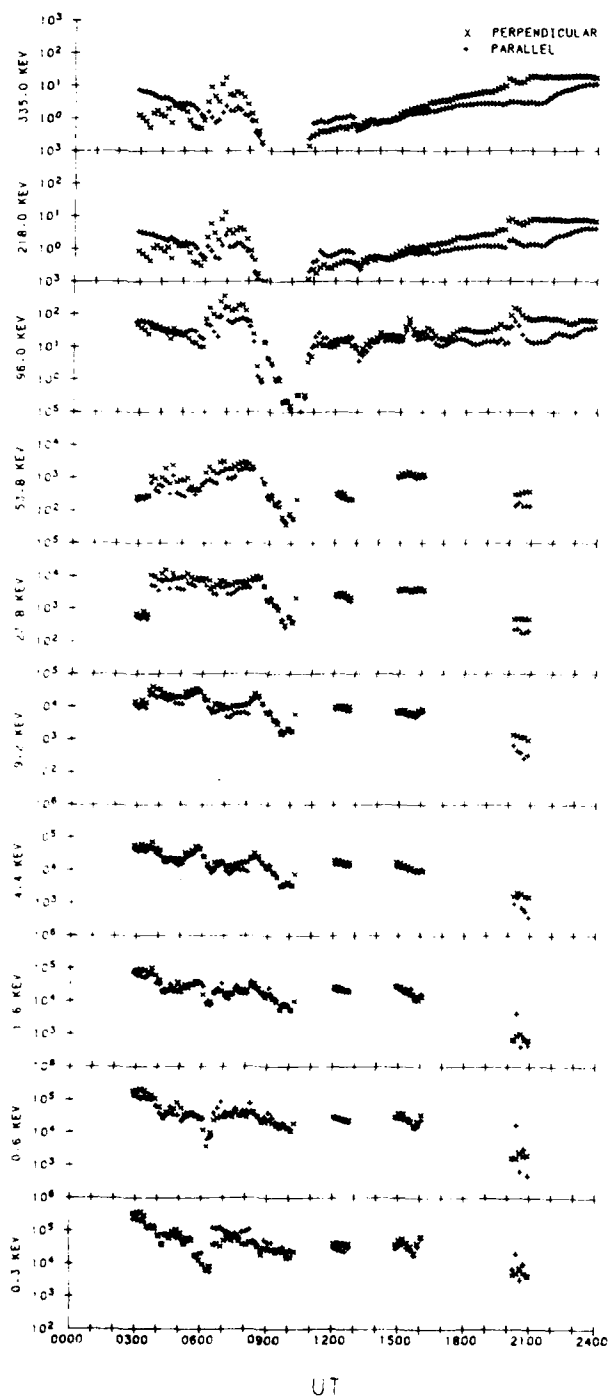
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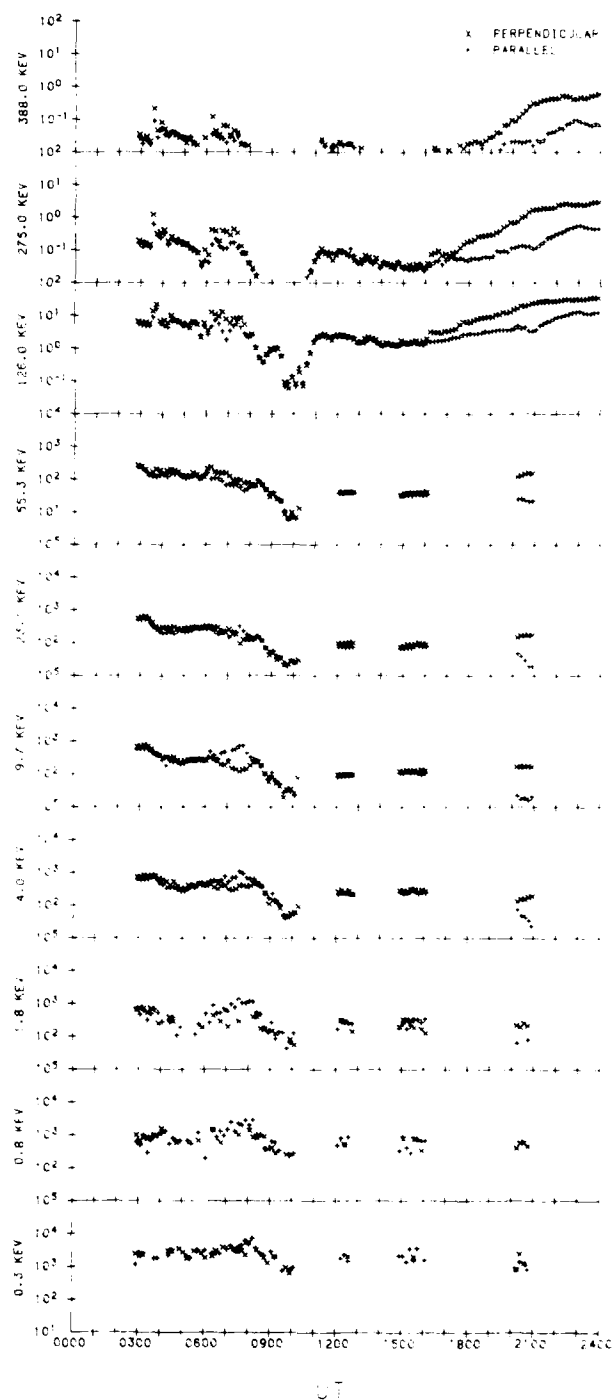
IONS DAY 117



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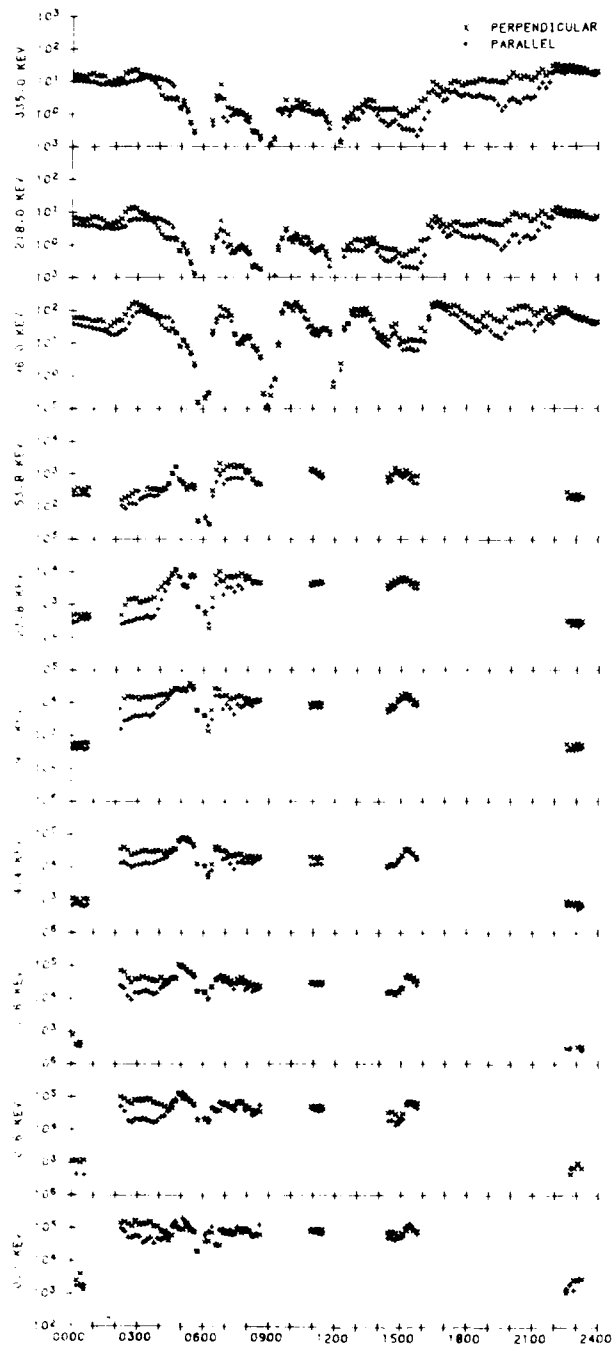


IONS DAY 118



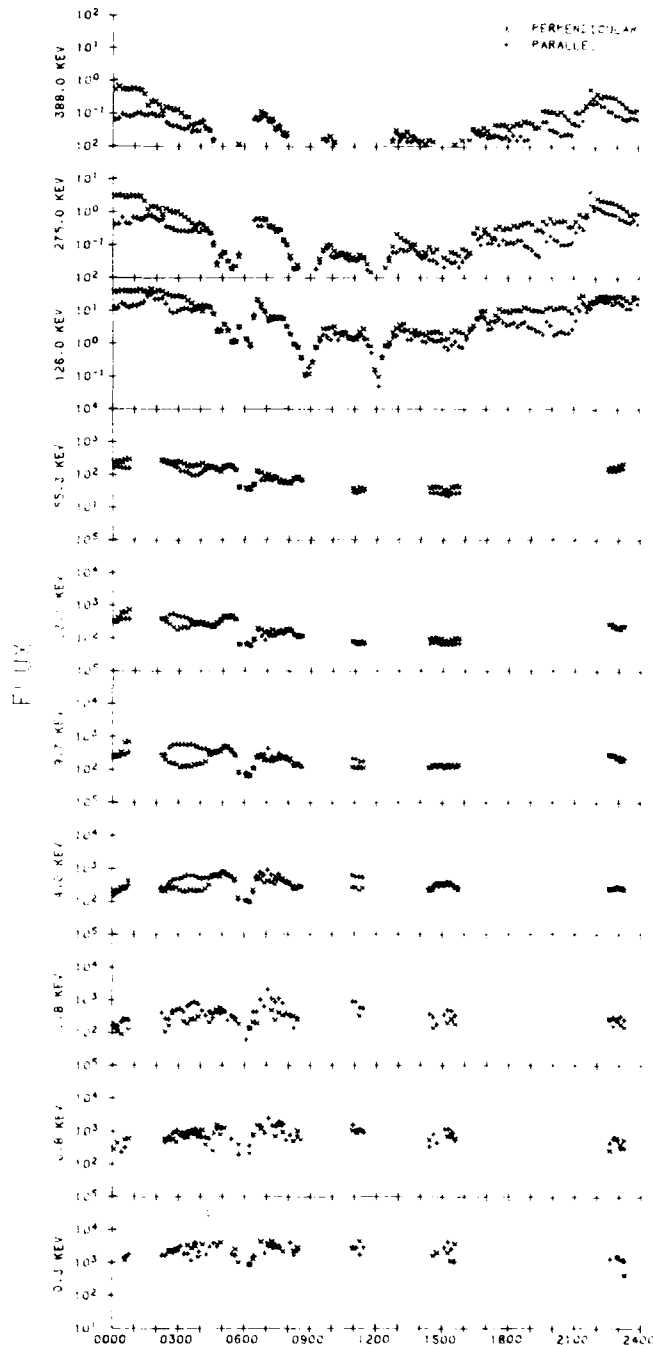
ELECTRONS

DAY 119

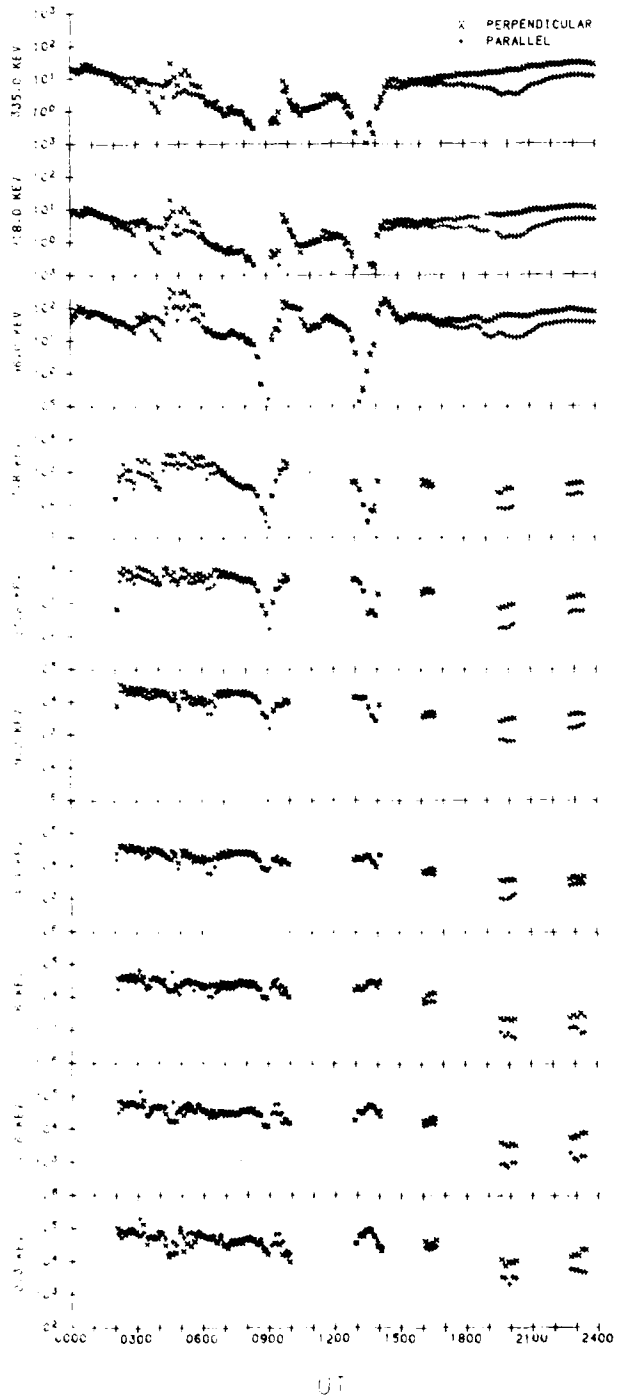


IONS

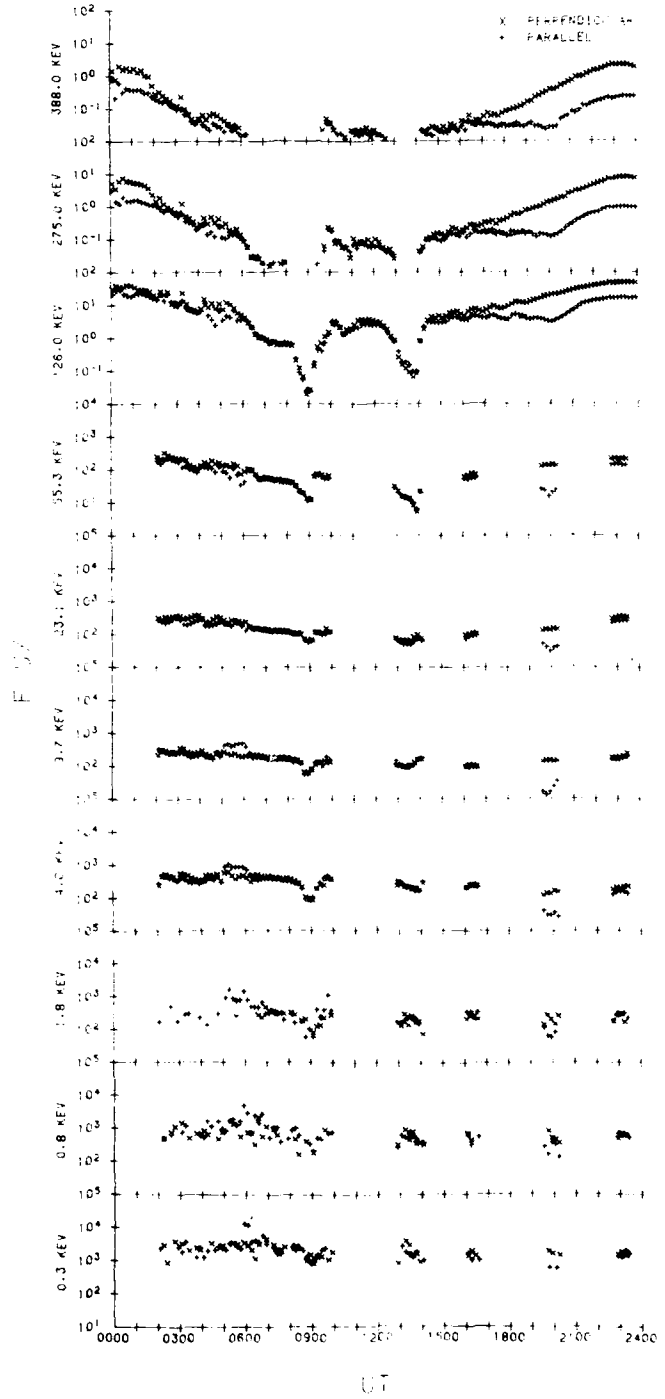
DAY 119



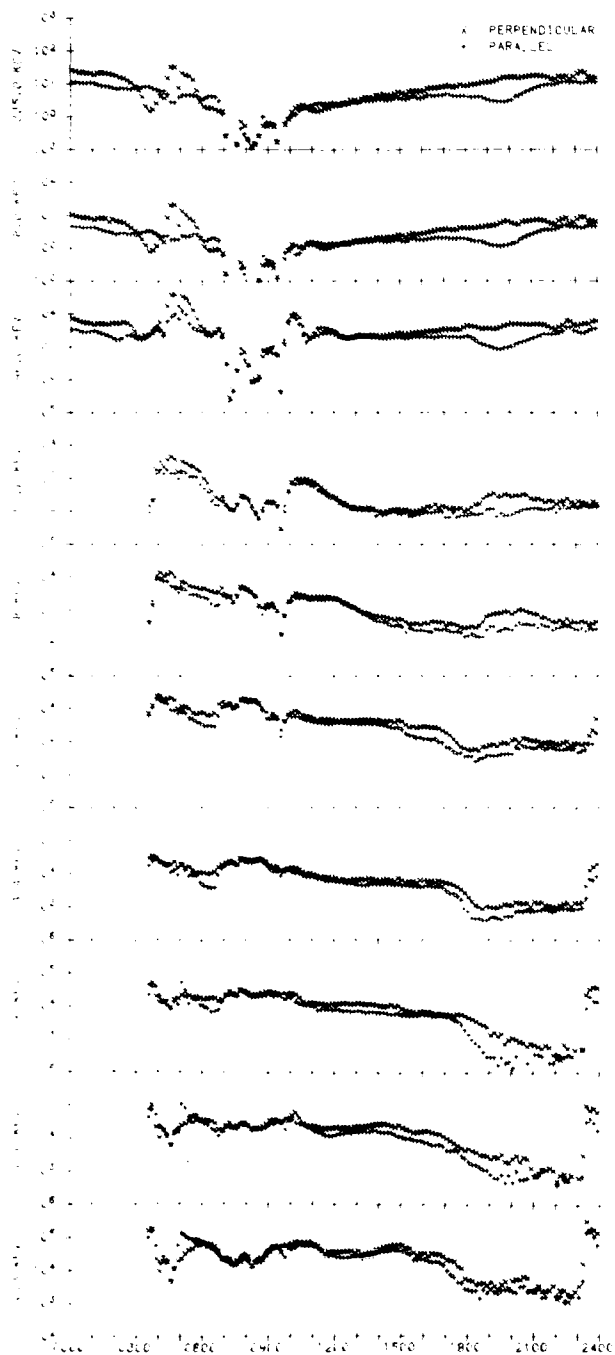
ELECTRONS
DAY 120



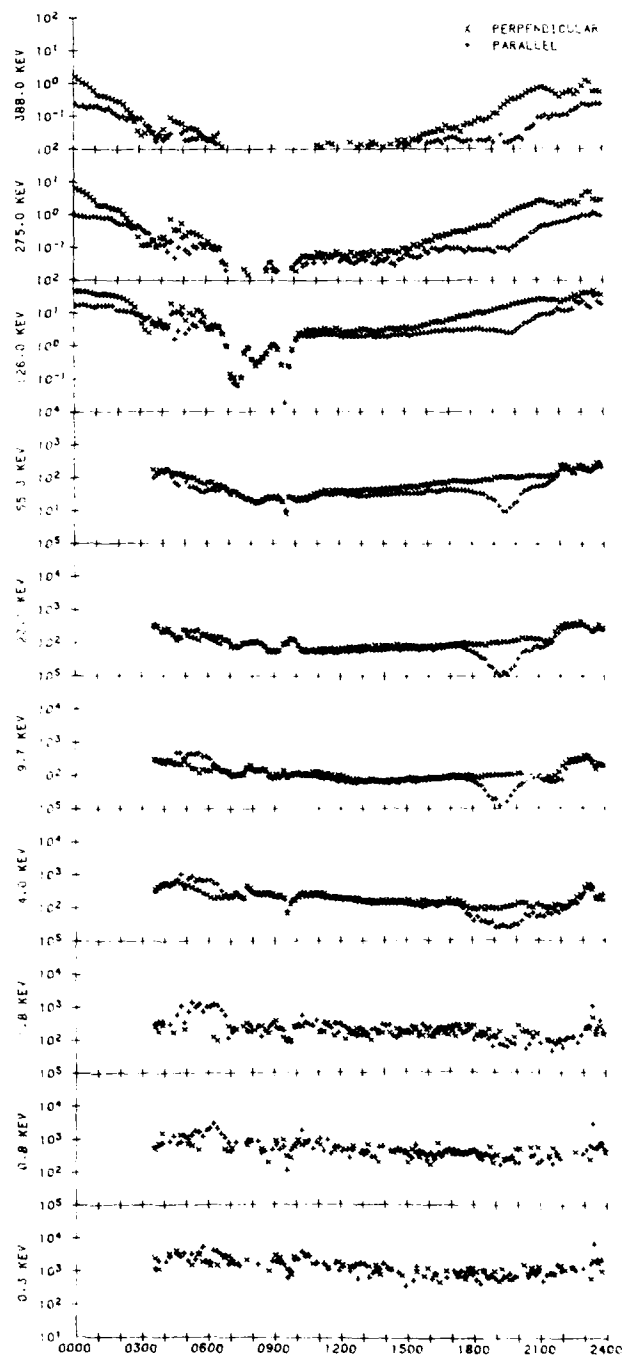
IONS
DAY 120



ELECTRONS
DAY 121

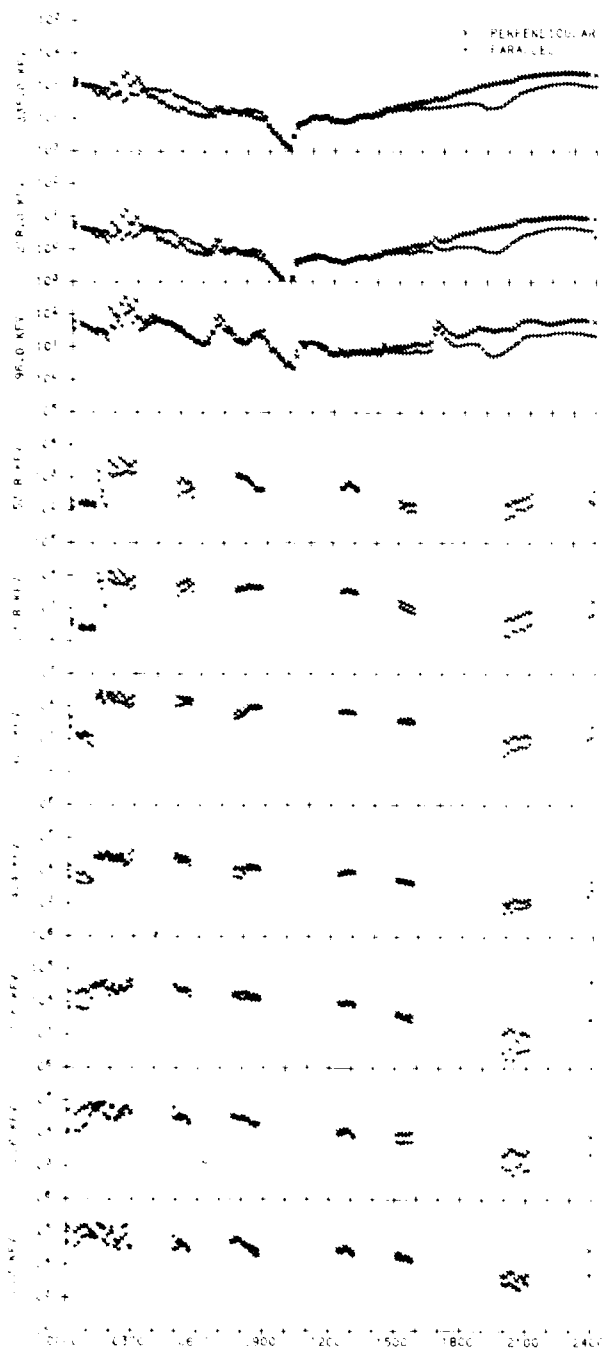


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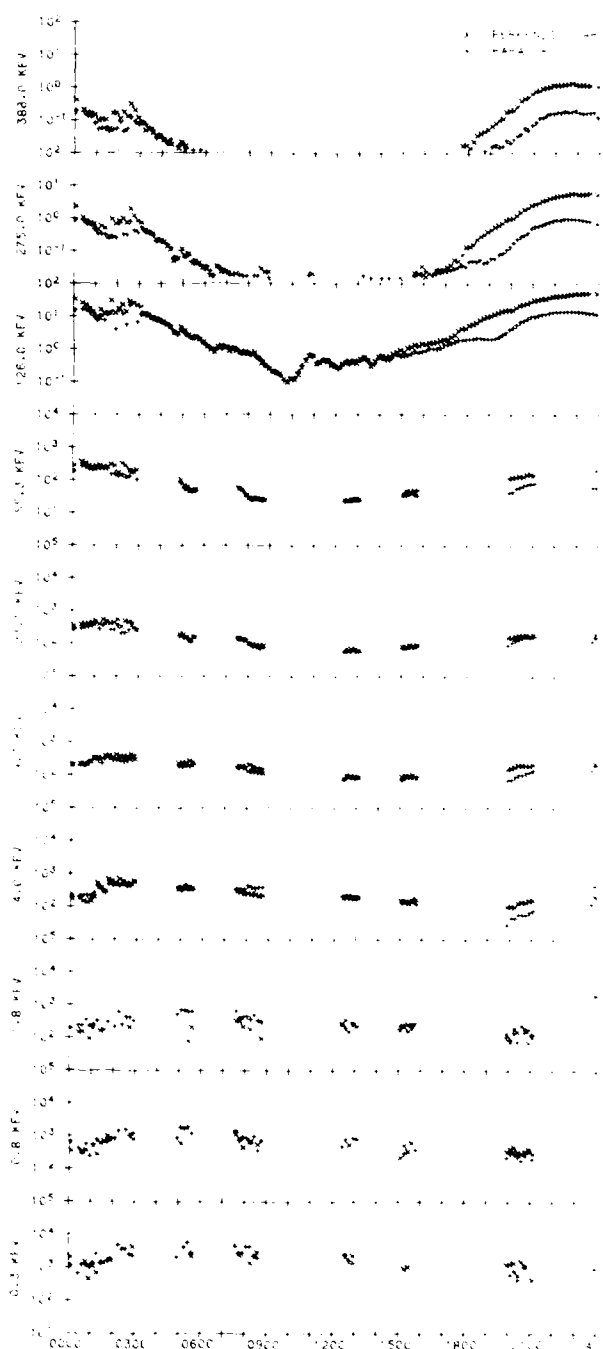


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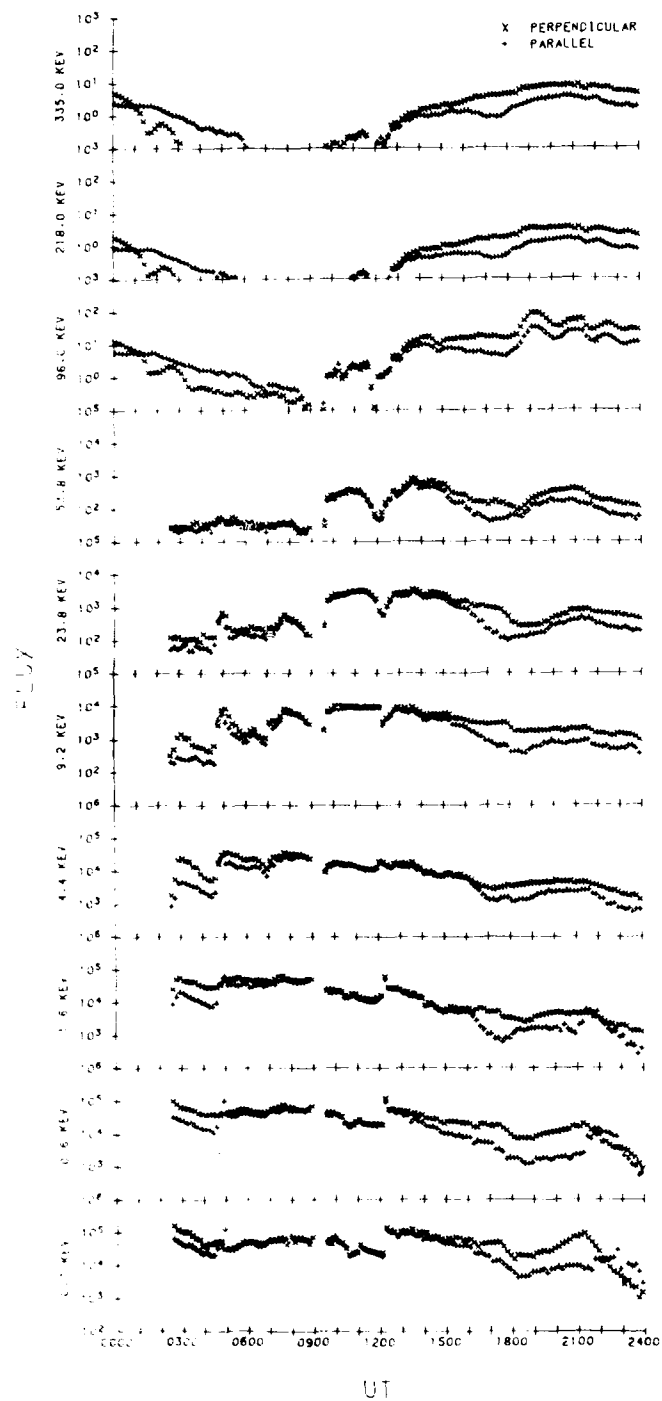
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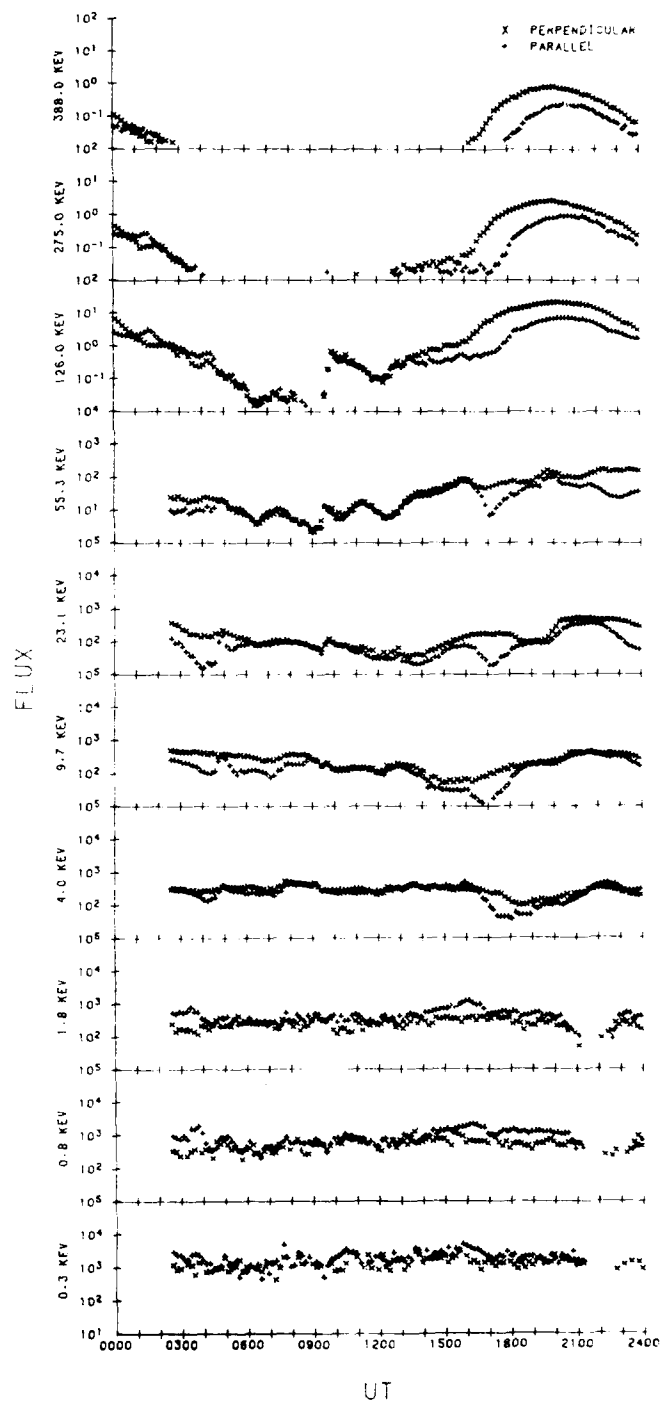
IONS DAY 122



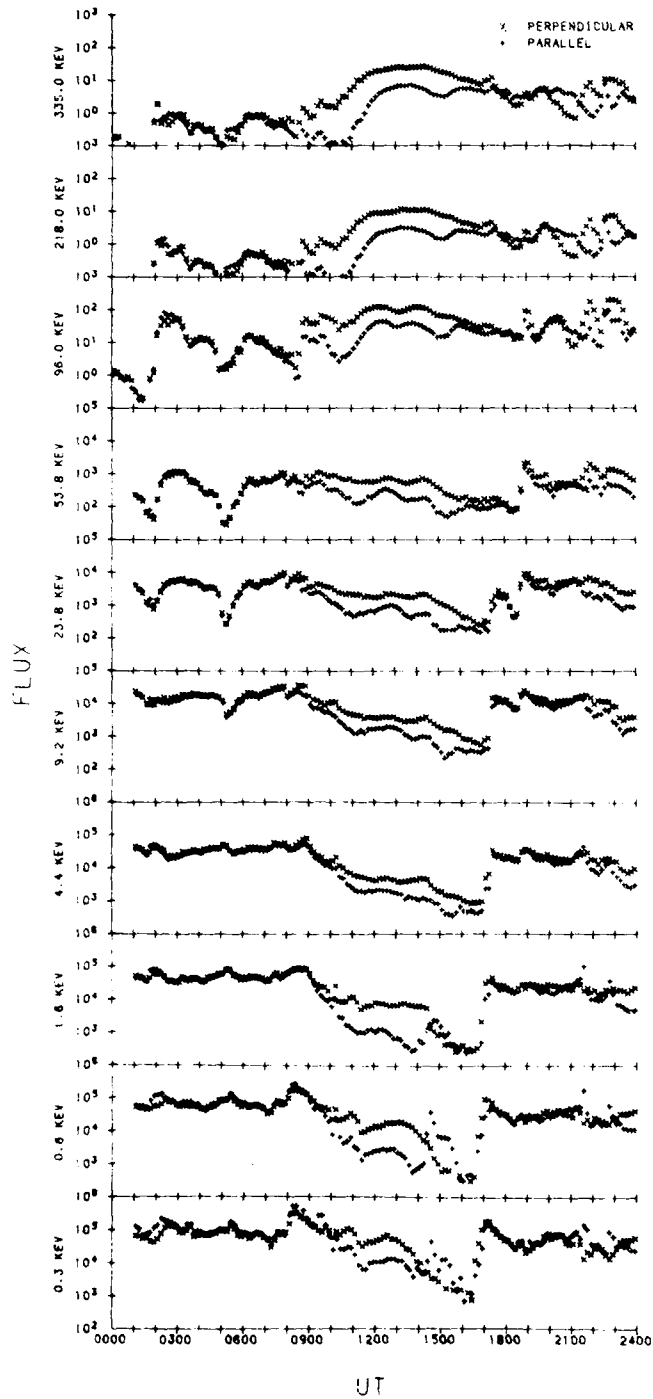
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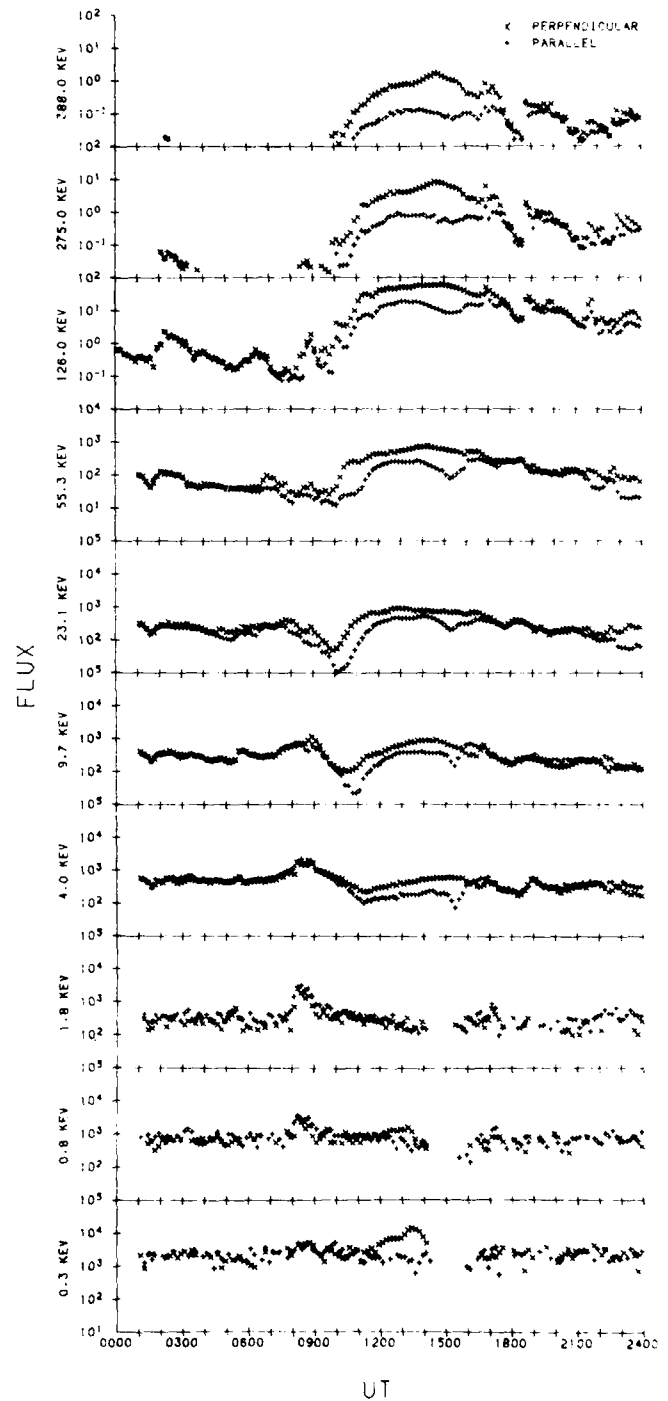
IONS DAY 127



ELECTRONS
DAY 142



IONS
DAY 142



AD-A214 285

SCATNA (SPACECRAFT CHARGING AT HIGH ALTITUDES) ATLAS
DATA BASE VOLUME 2 (U) GEOPHYSICS LAB (AFSC) HANSCOM AFB
RM E G MULLEN ET AL. 01 SEP 89 GL-TR-89-0249(2)

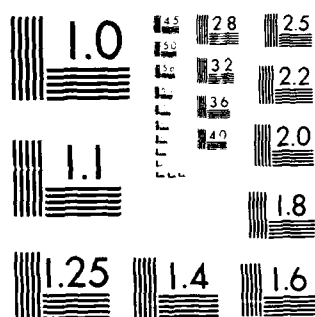
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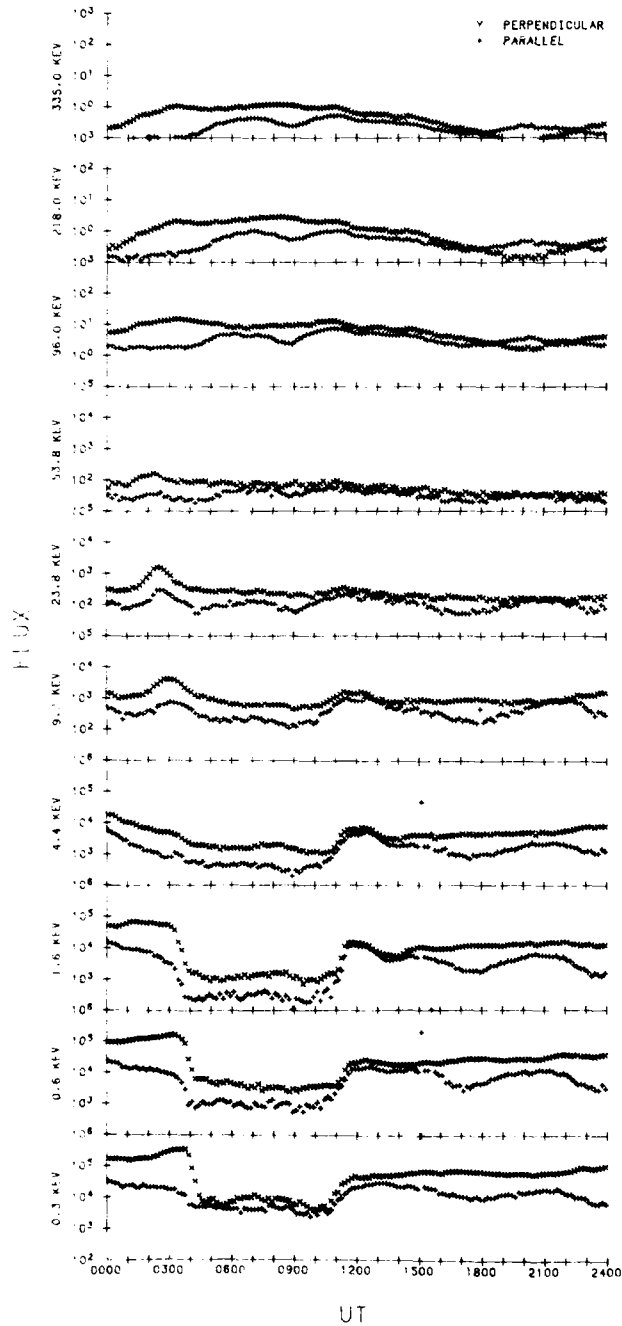
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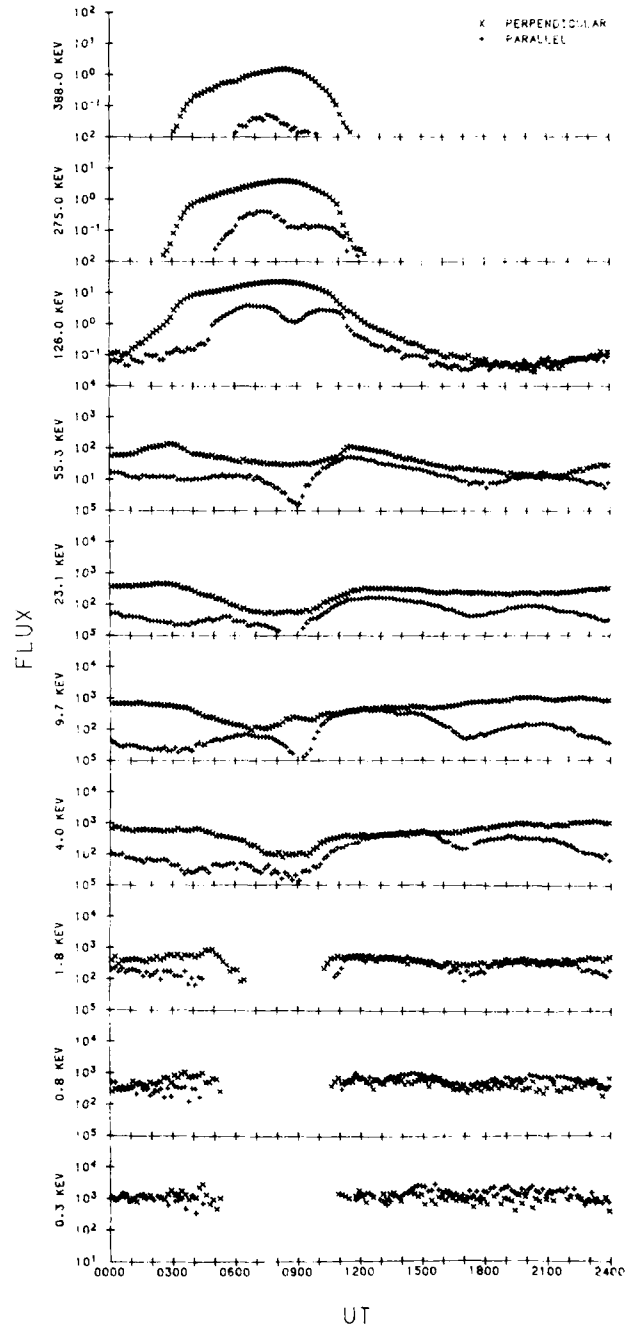
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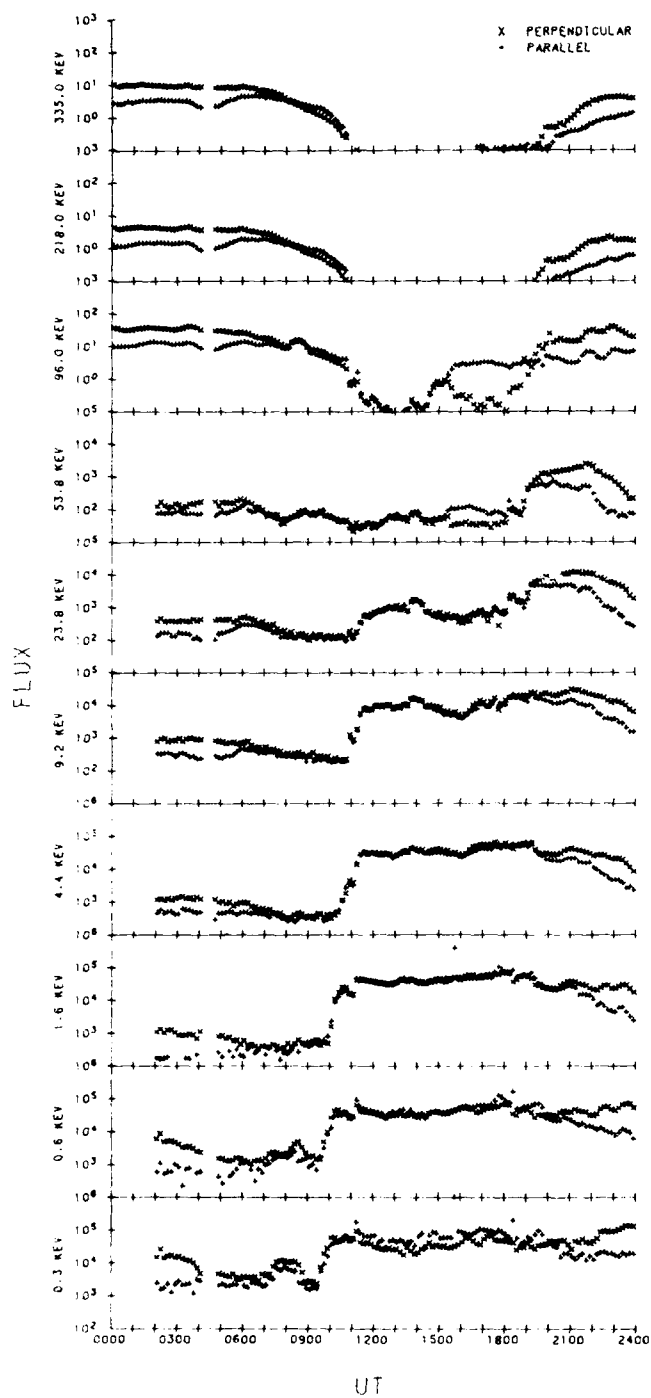
ELECTRONS
DAY 156



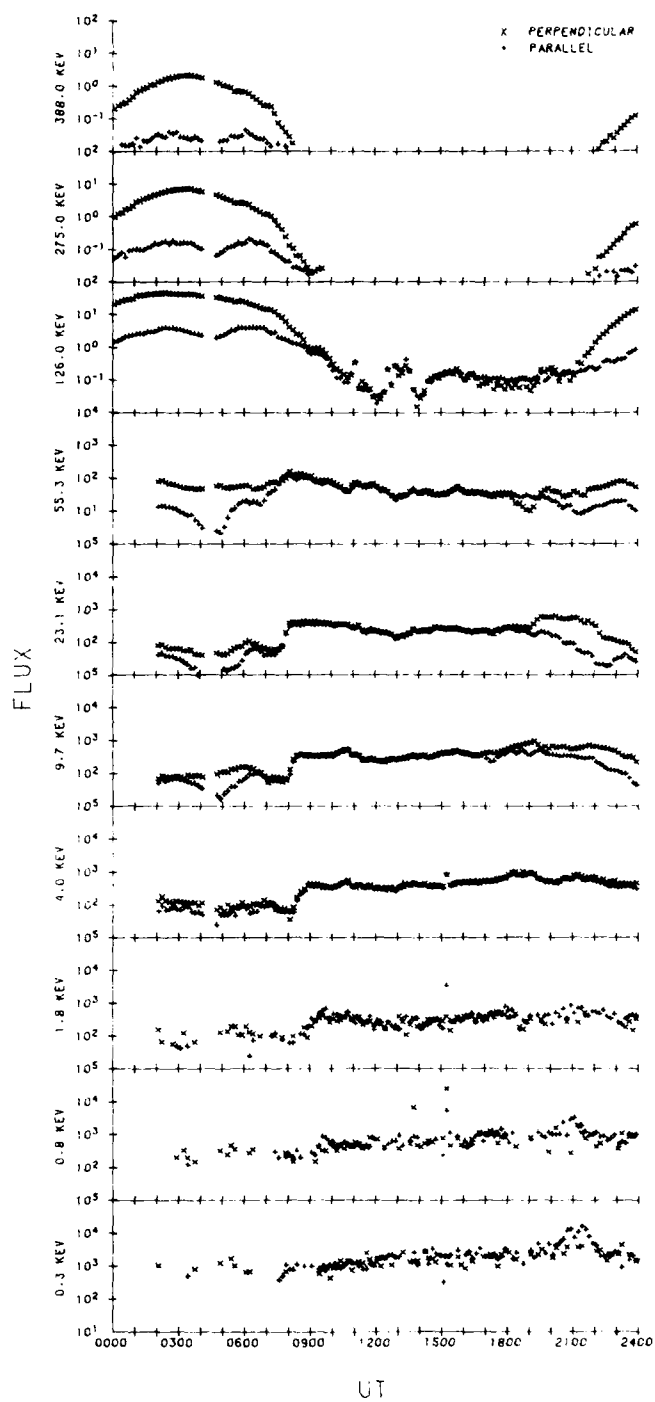
IONS
DAY 156



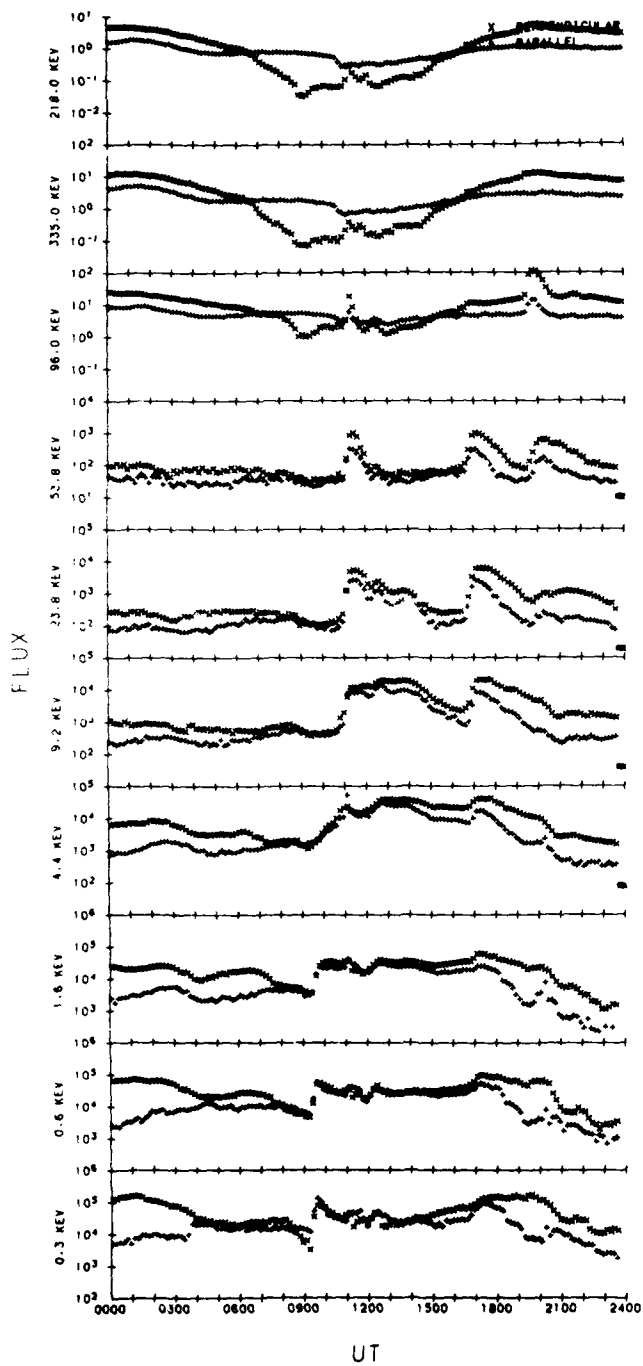
ELECTRONS
DAY 166



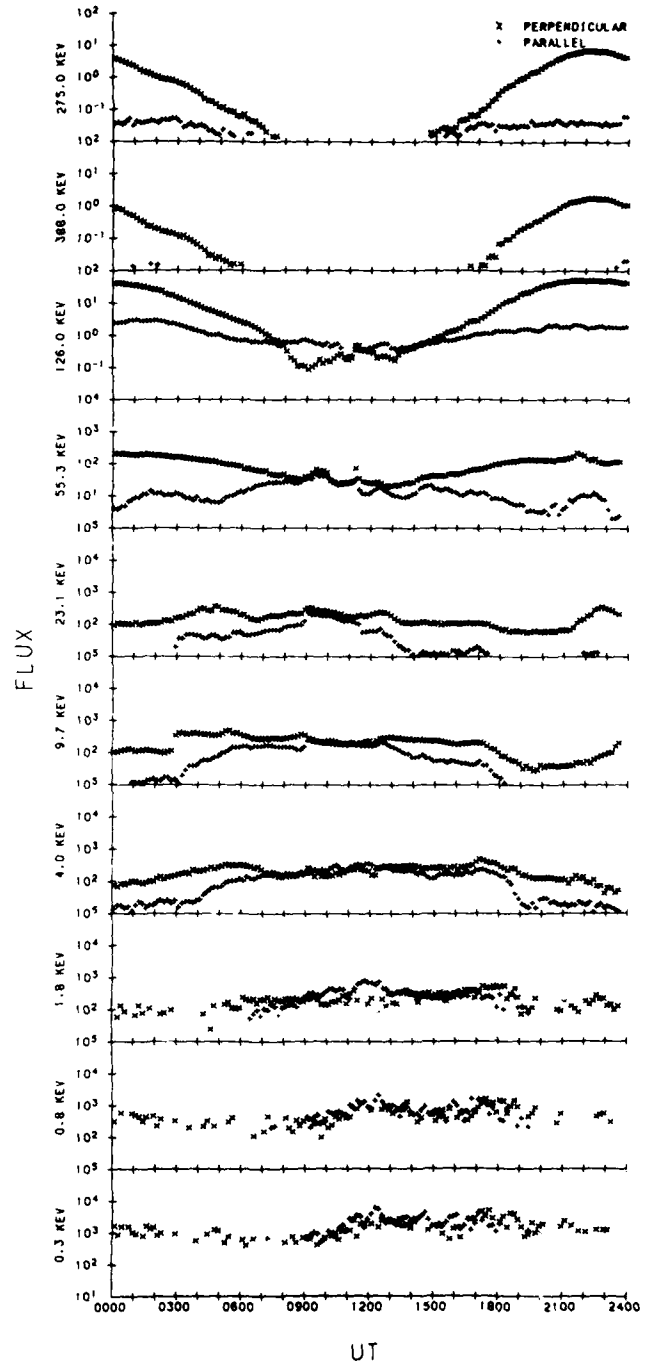
IONS
DAY 166



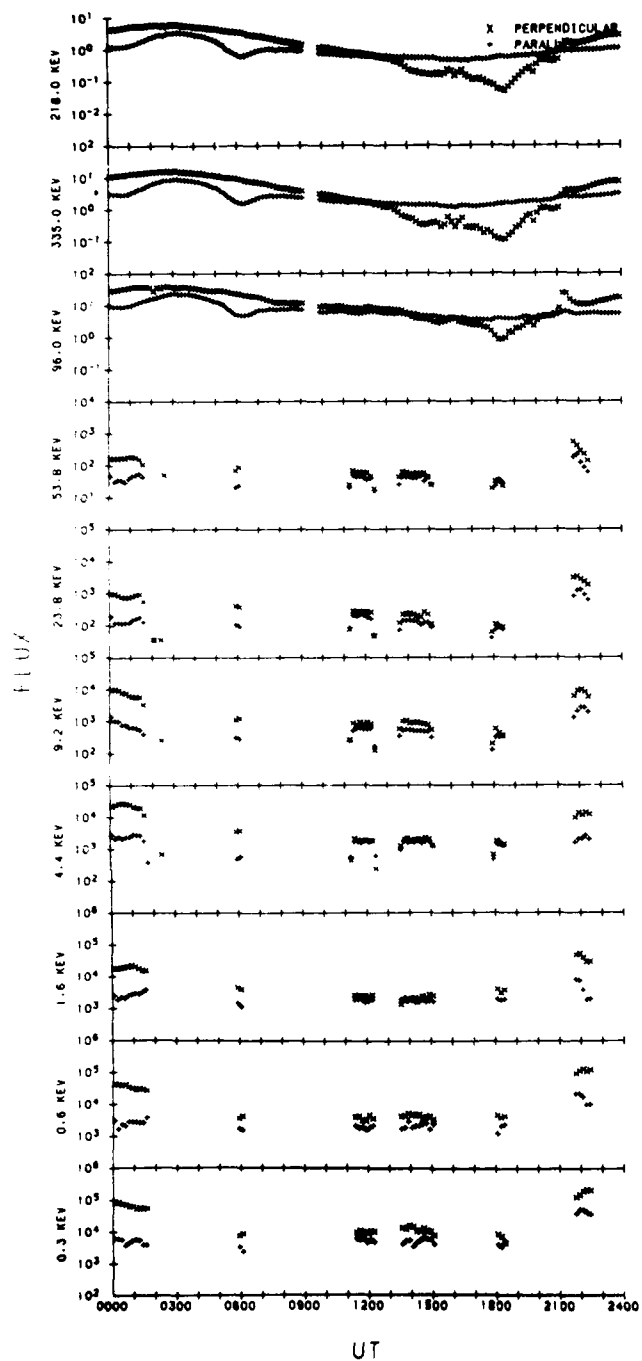
ELECTRONS DAY 180



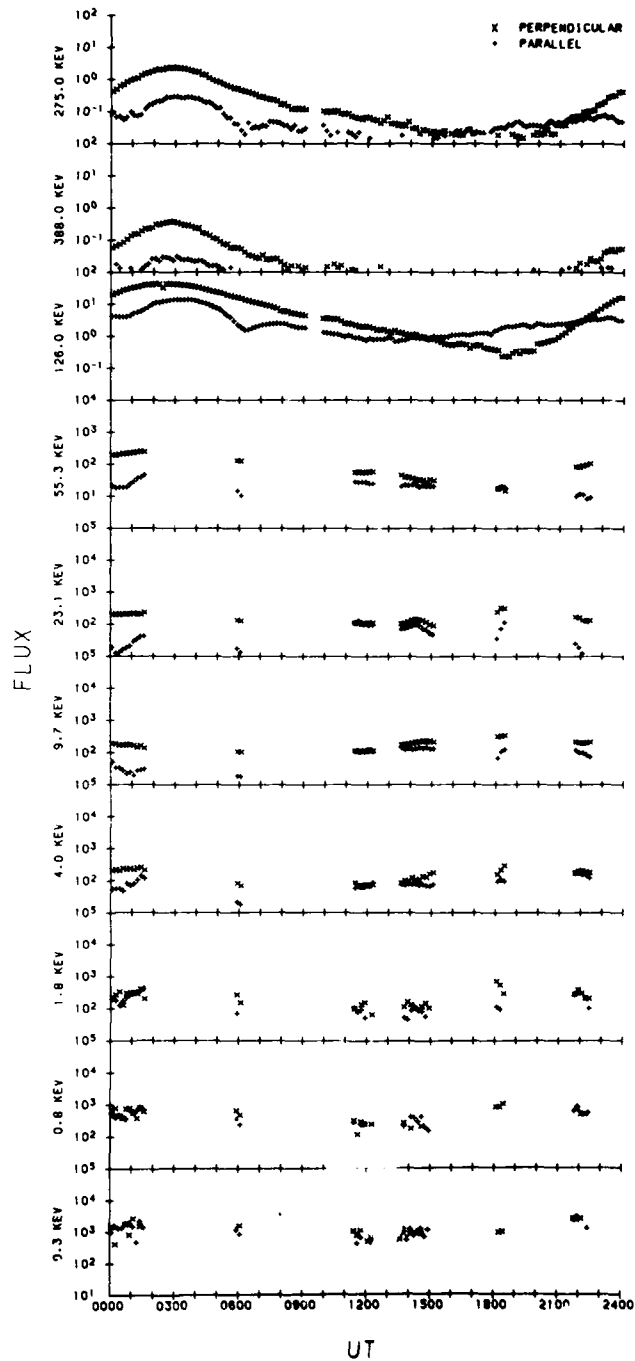
IONS DAY 180



ELECTRONS DAY 227

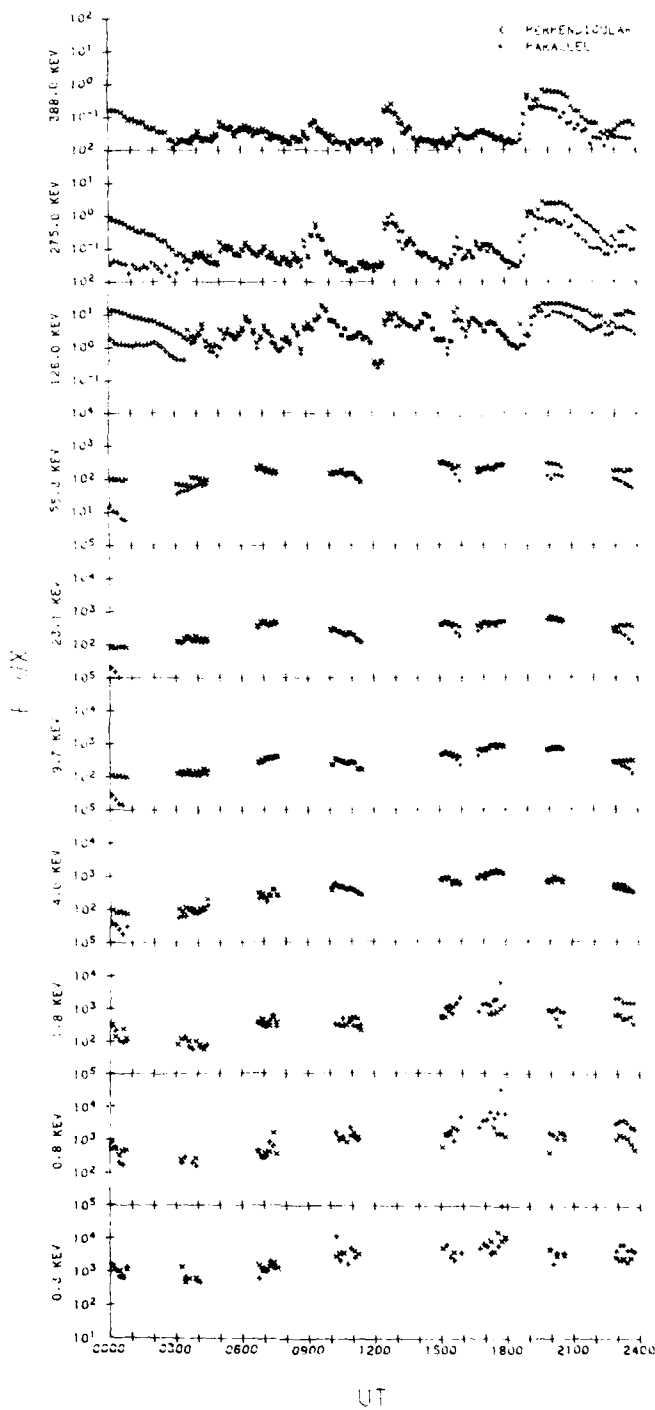
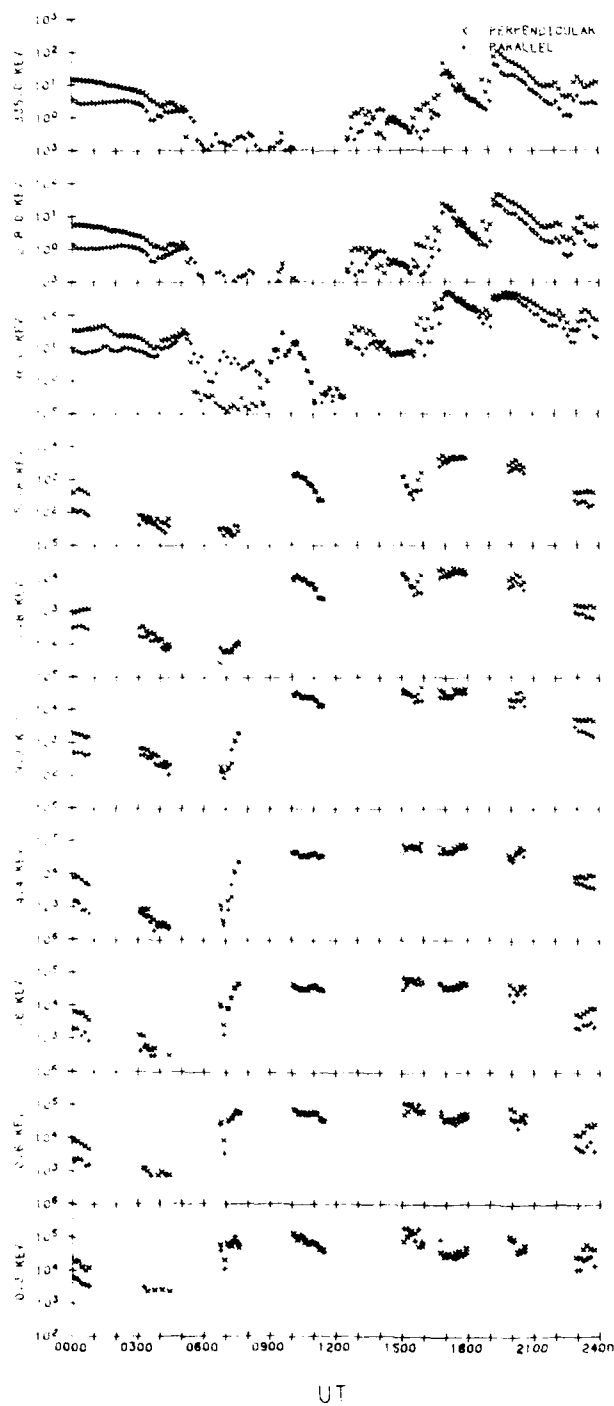


IONS DAY 227

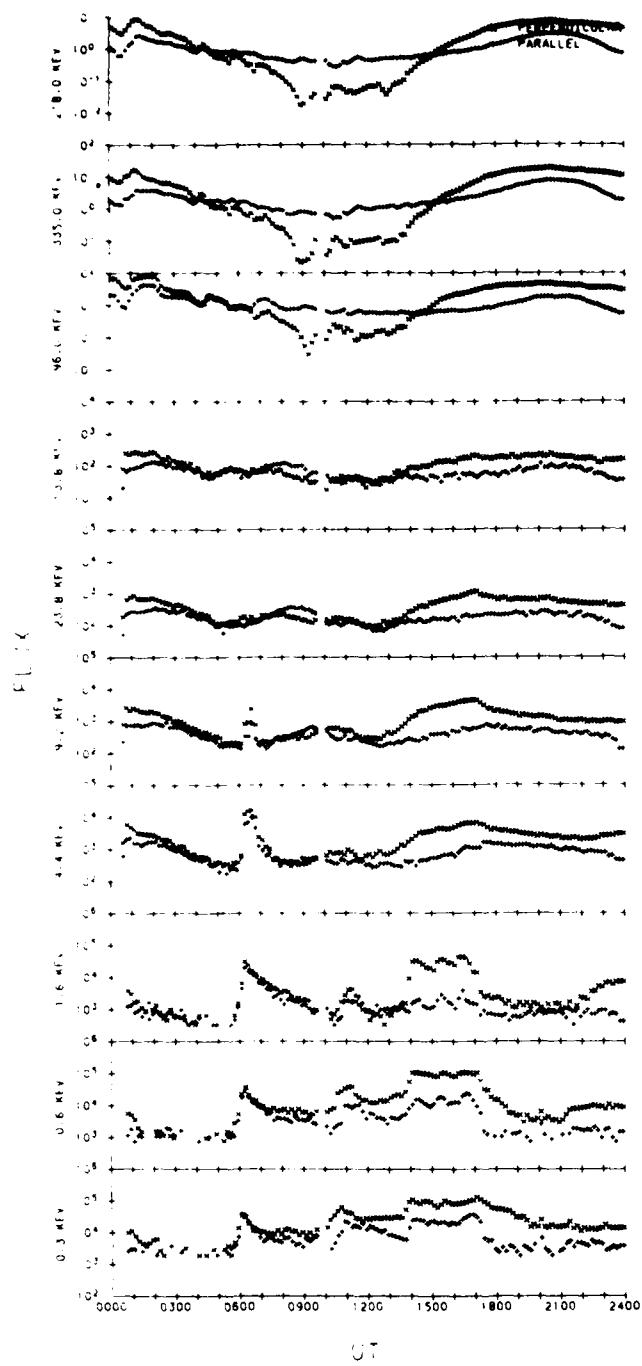


ELECTRONS DAY 241

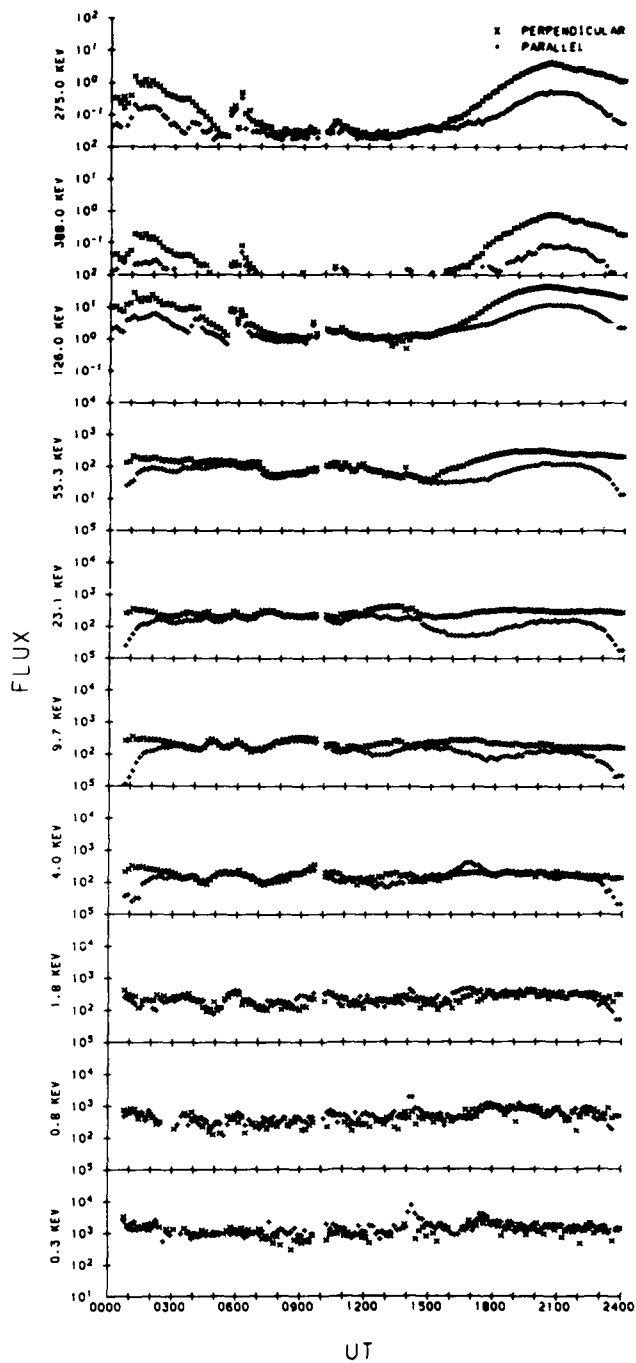
IONS DAY 241



ELECTRONS
DAY 242

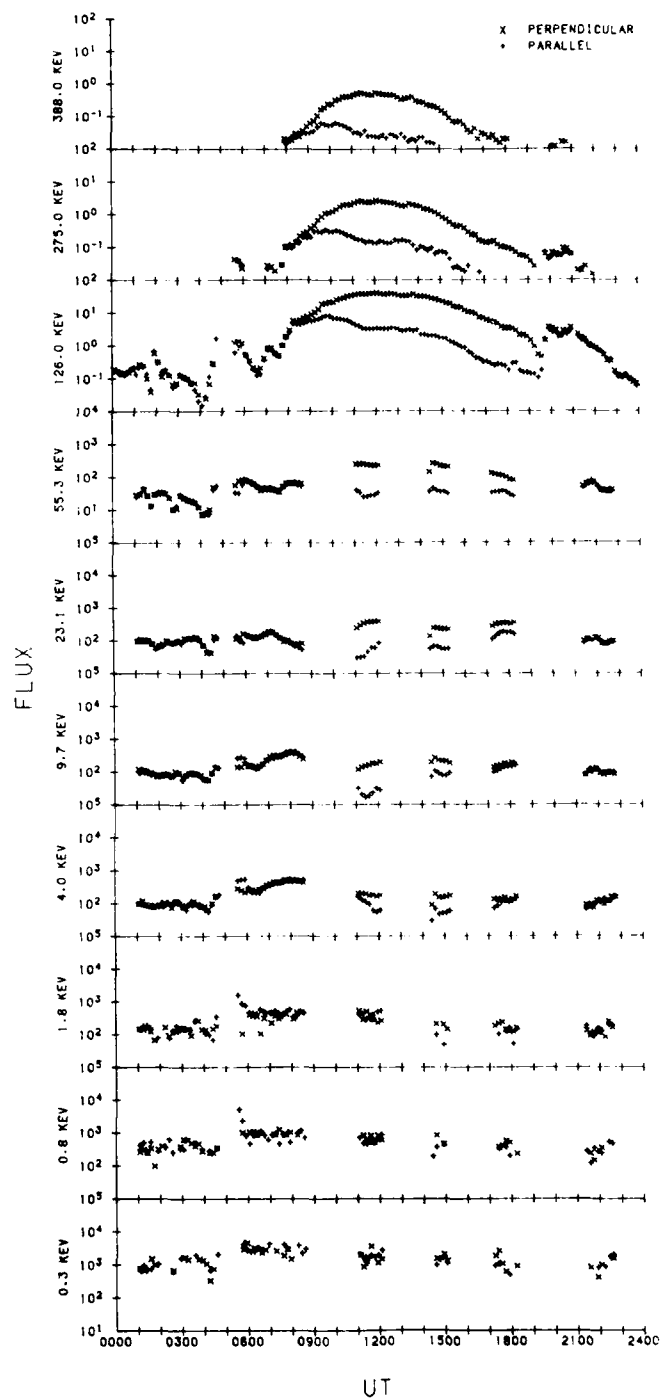
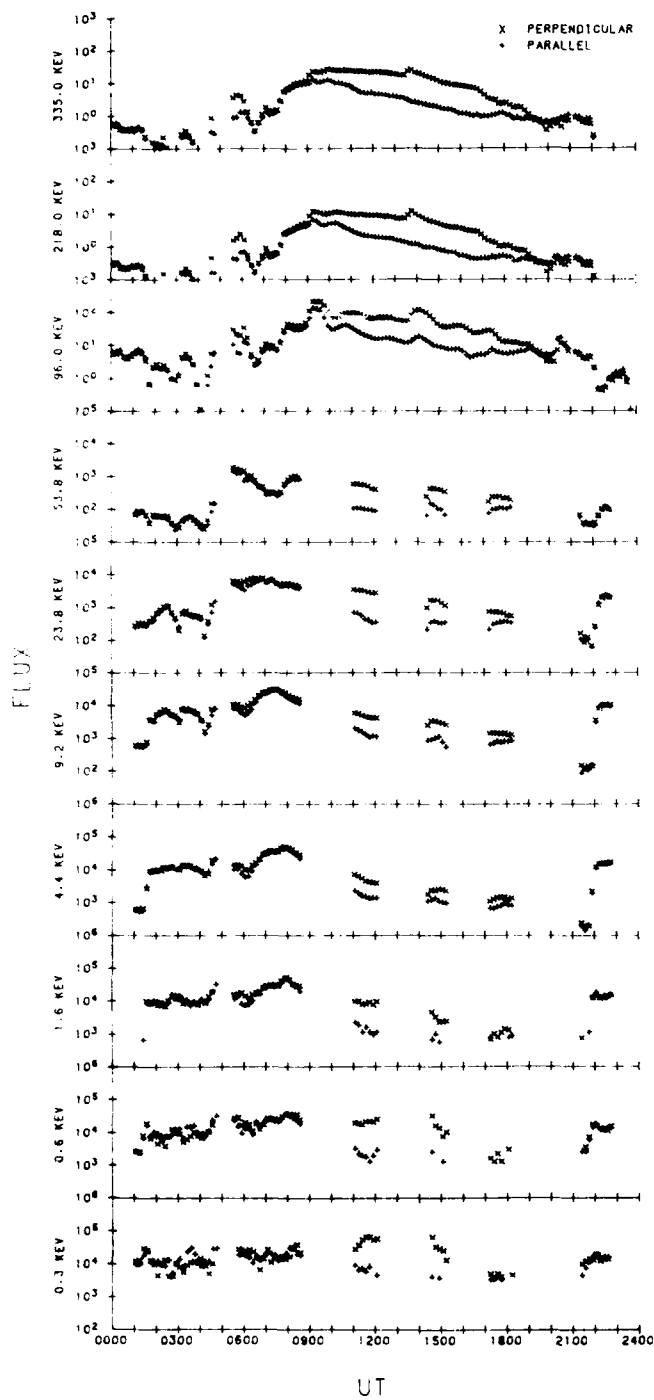


IONS
DAY 242

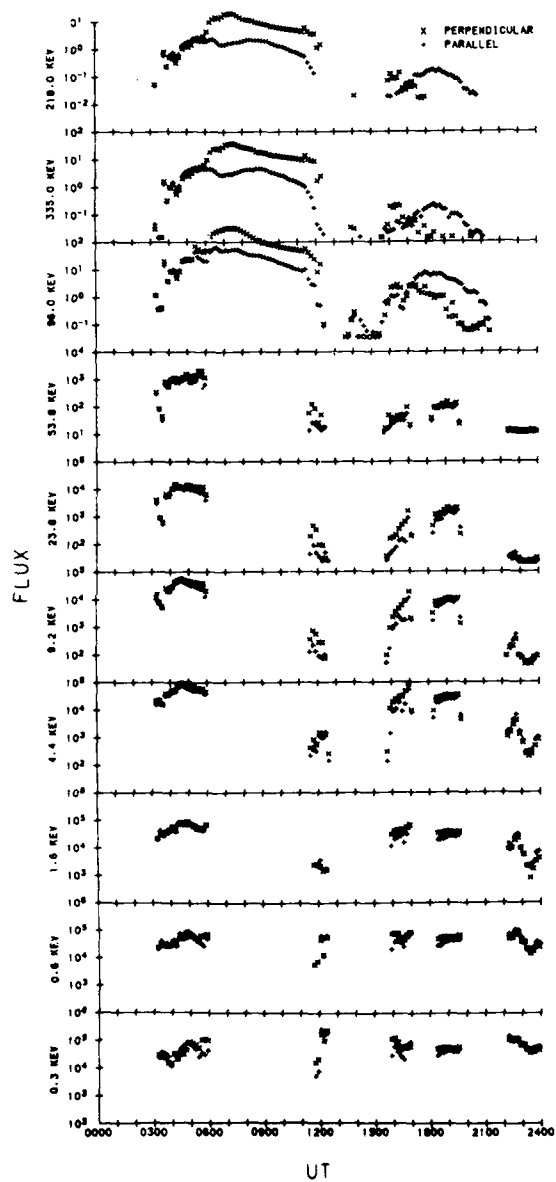


ELECTRONS
DAY 271

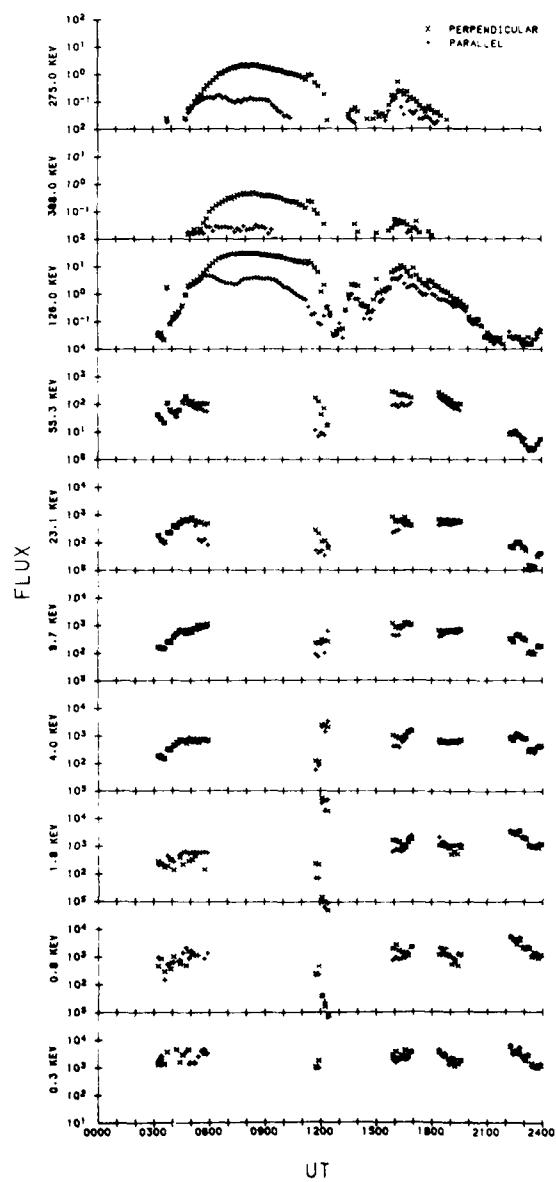
IONS
DAY 271



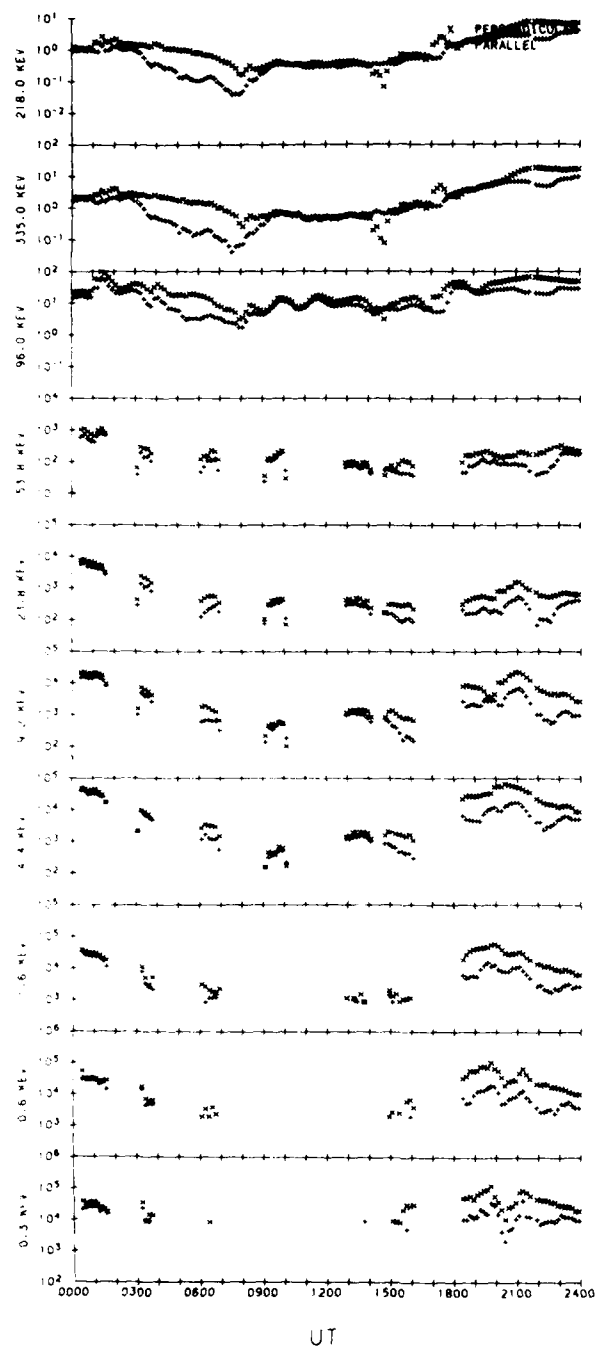
ELECTRONS
DAY 279



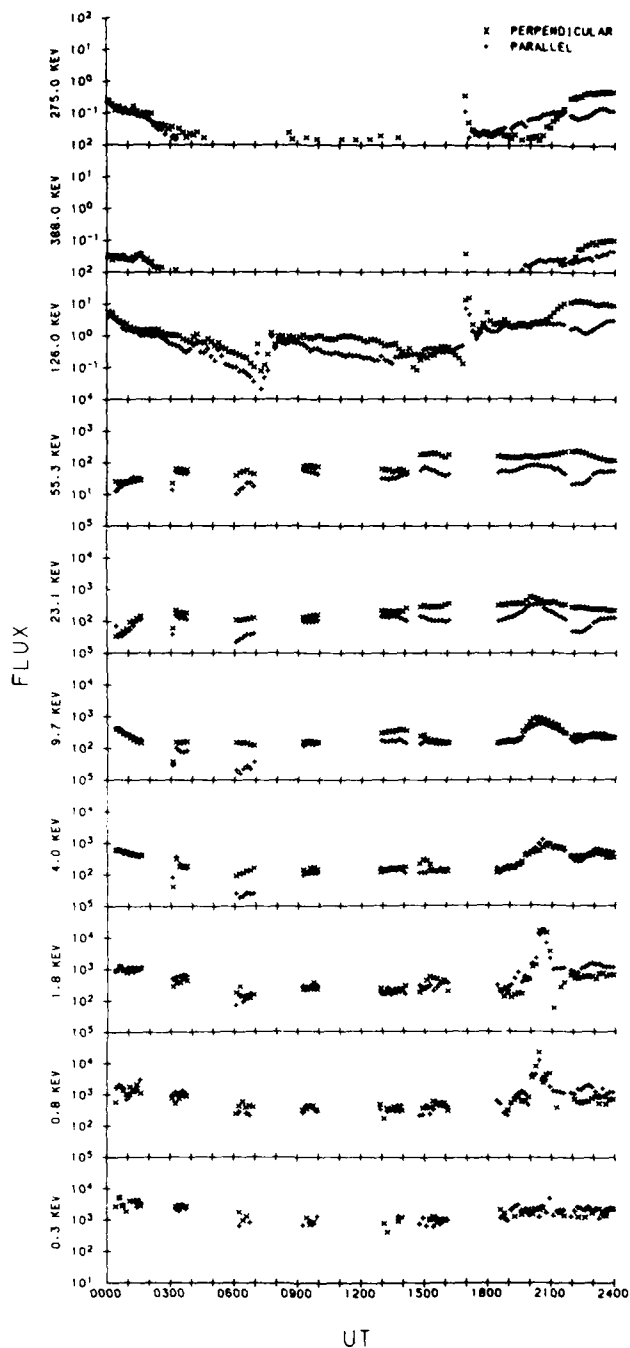
IONS
DAY 279



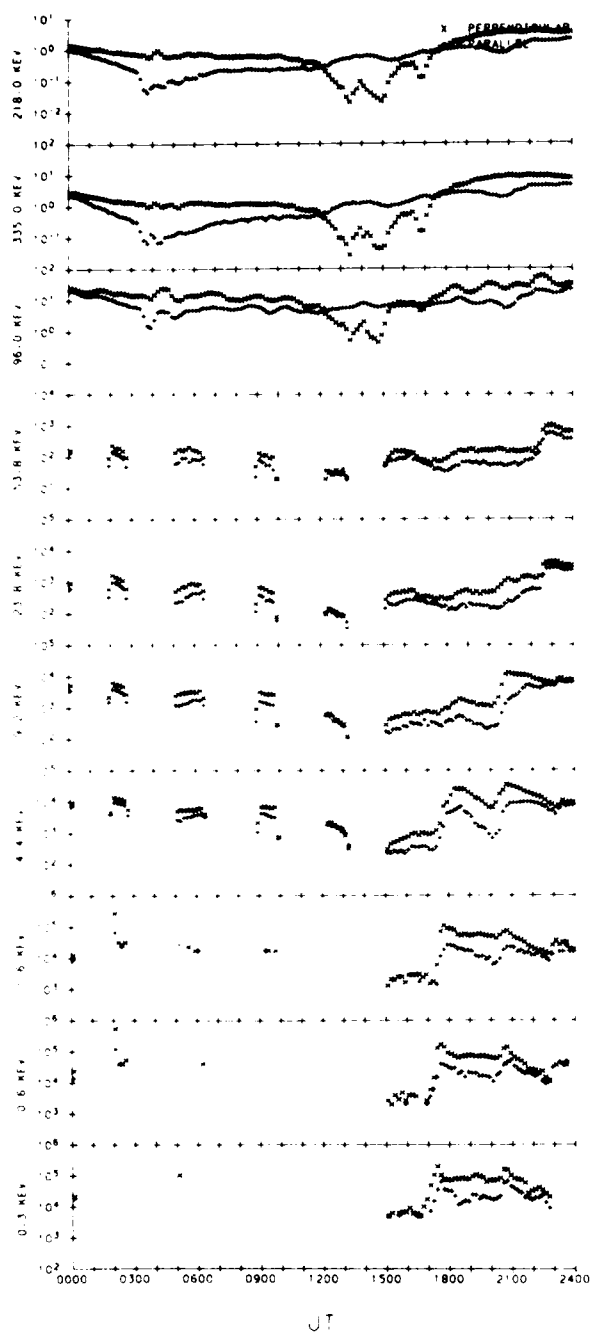
ELECTRONS DAY 295



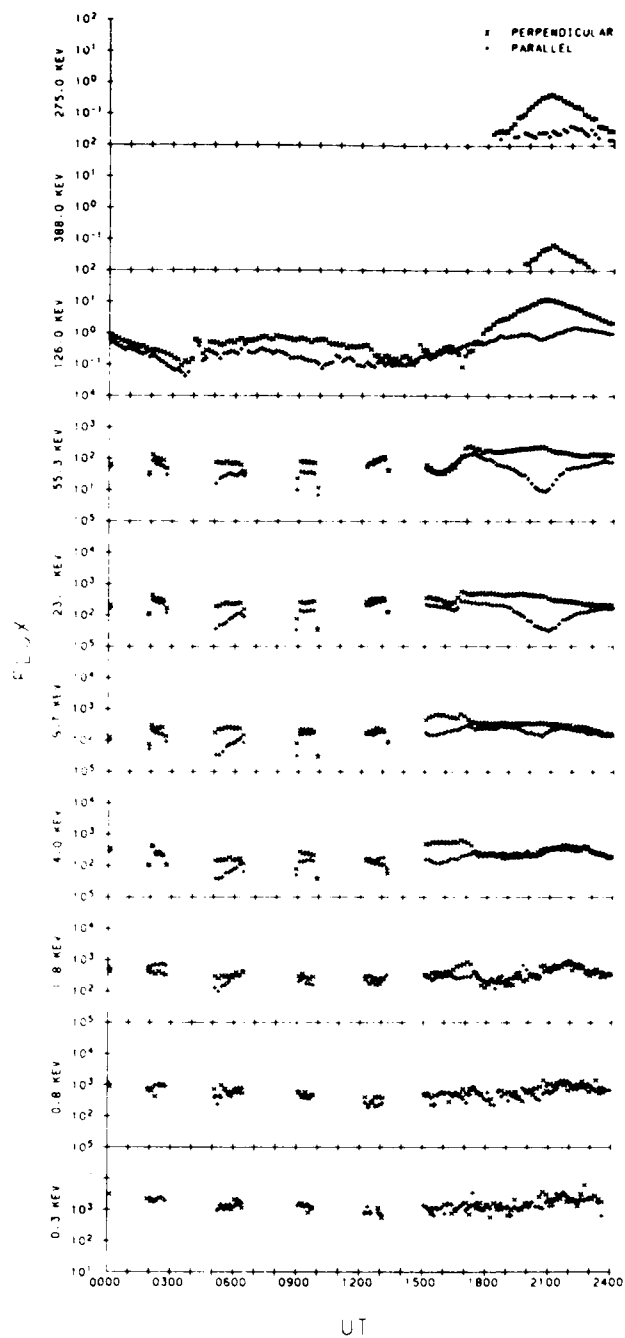
IONS DAY 295



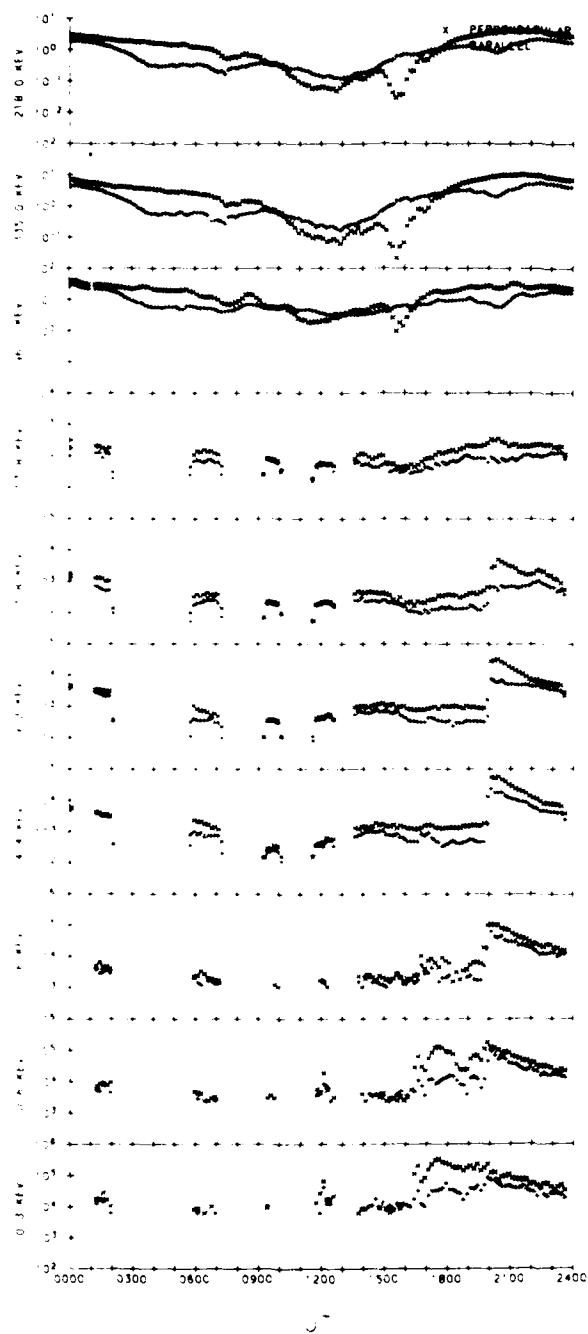
ELECTRONS DAY 299



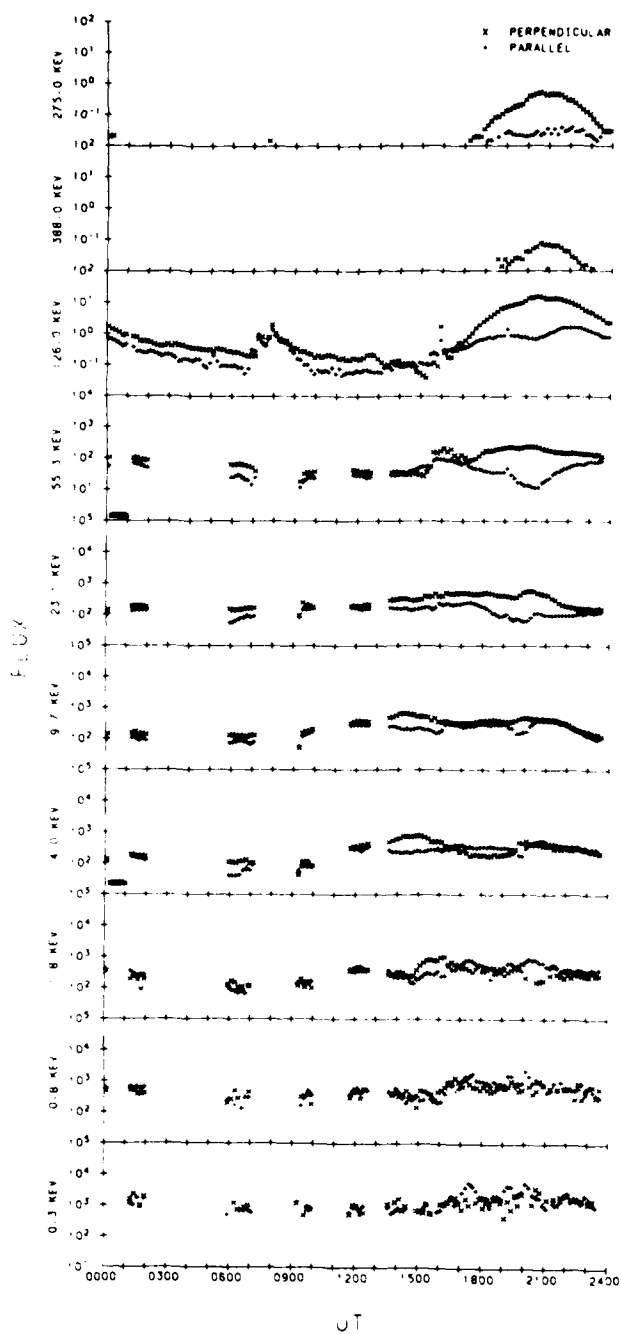
IONS DAY 299



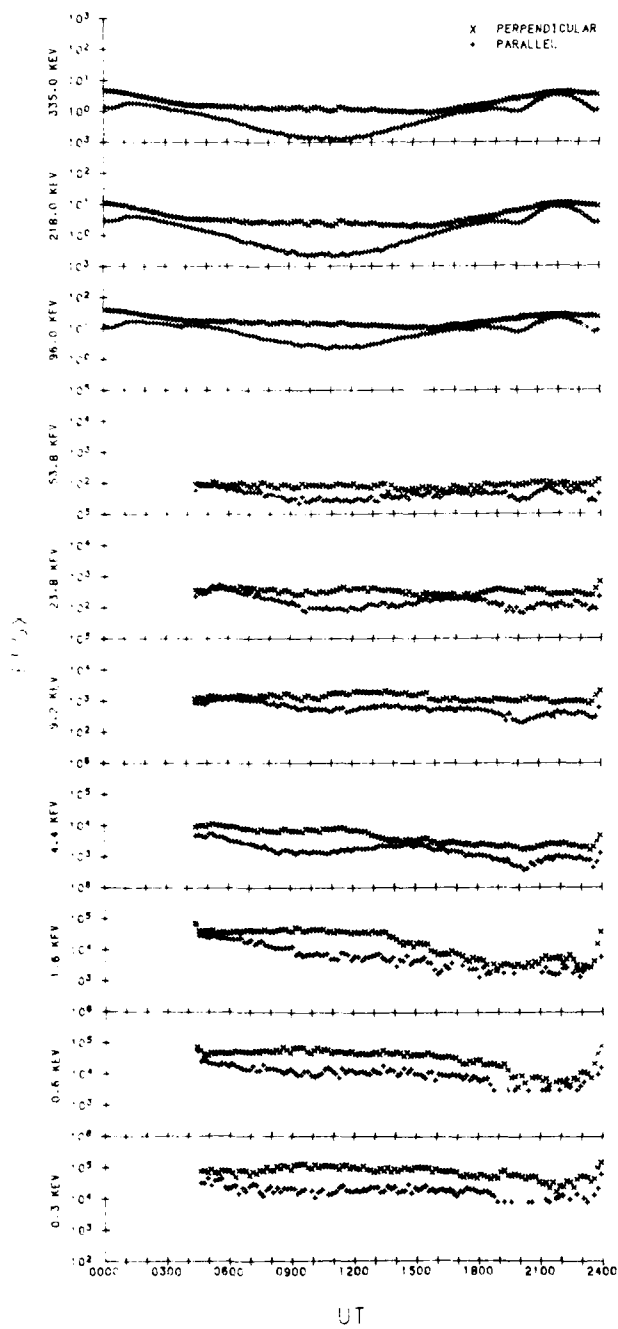
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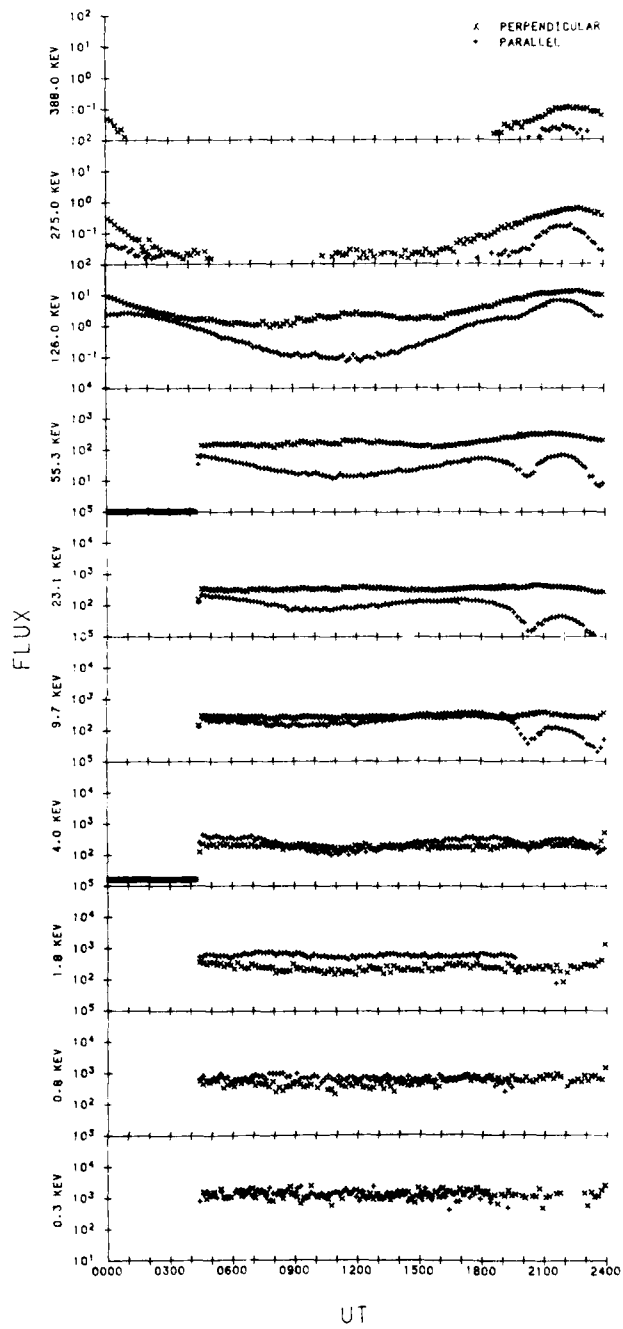
IONS DAY 300



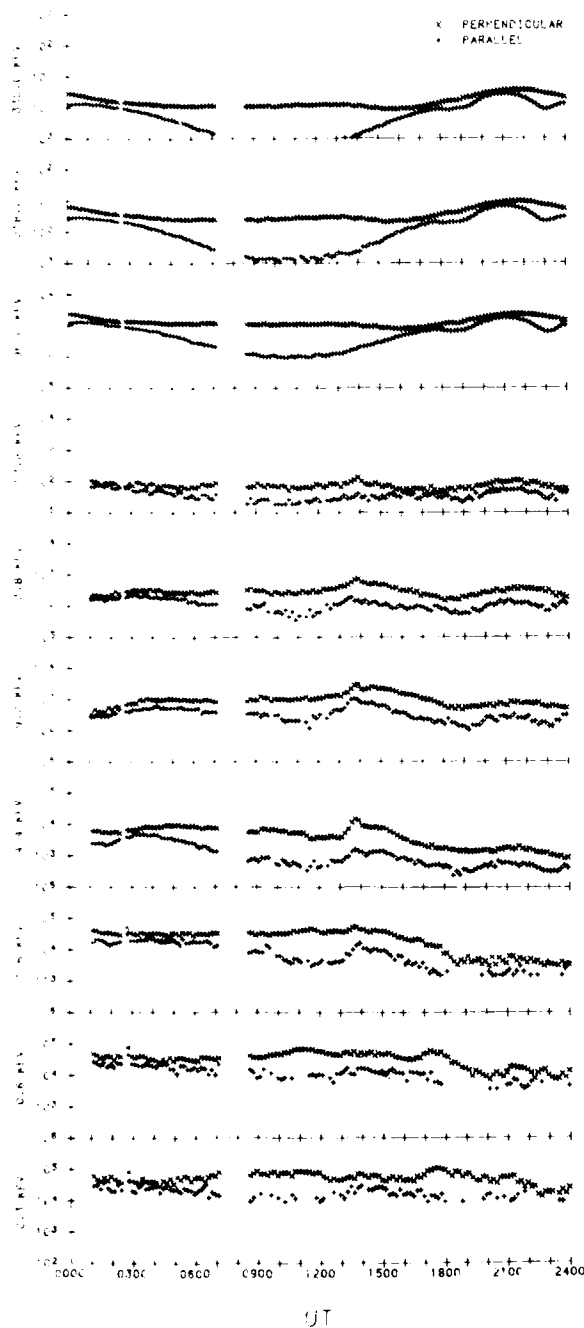
ELECTRONS
DAY 357



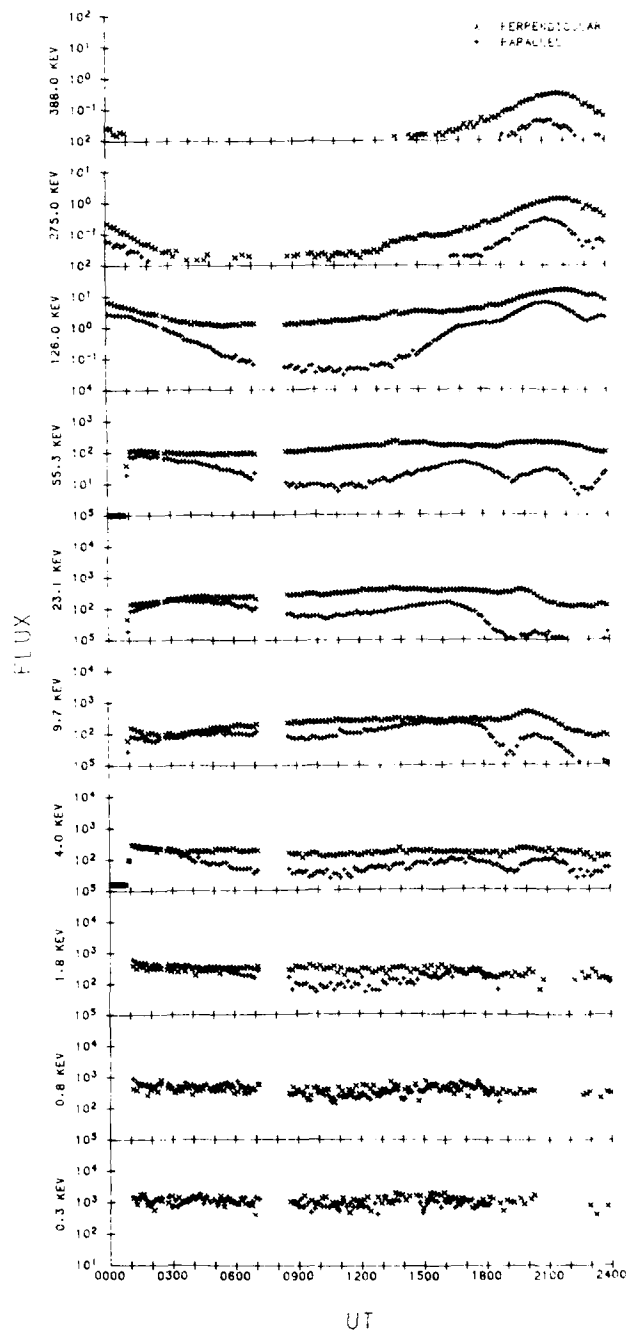
IONS
DAY 357



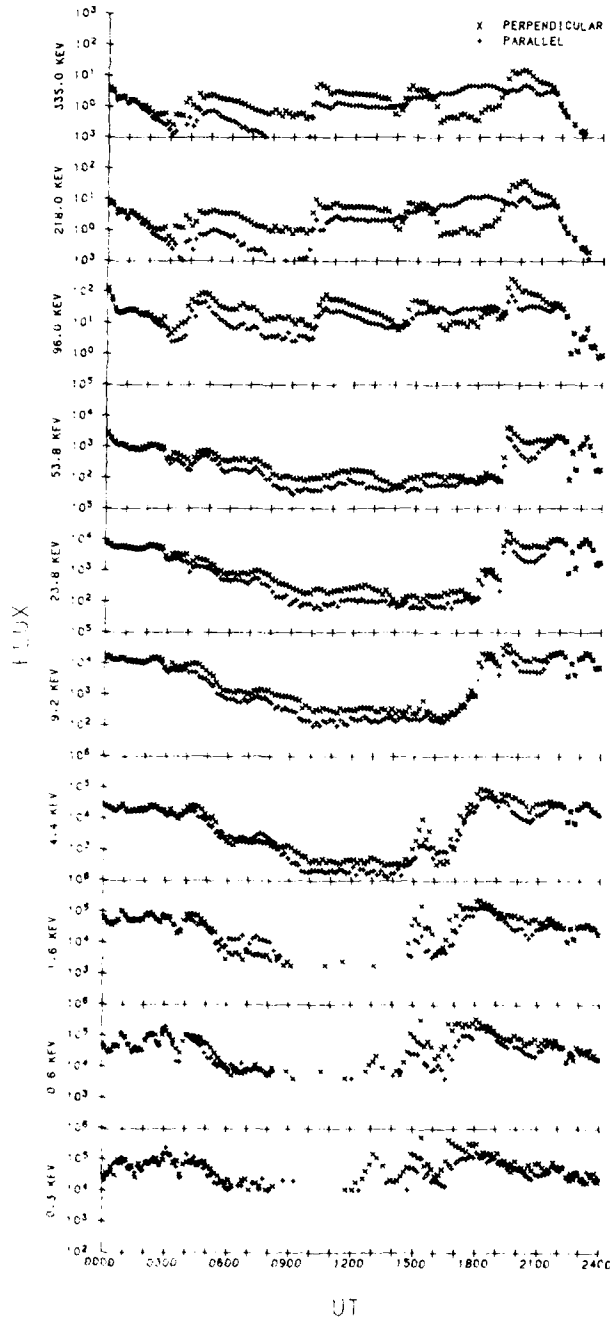
FLUORESCENCE DAY 359



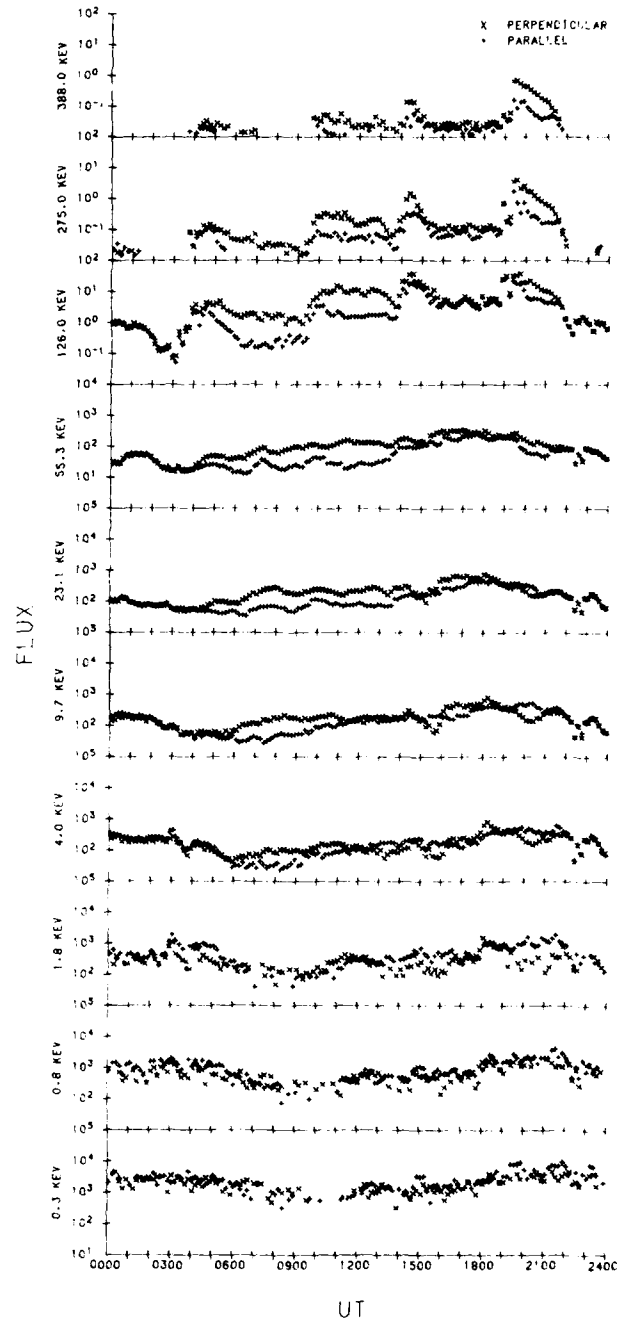
IONS DAY 359



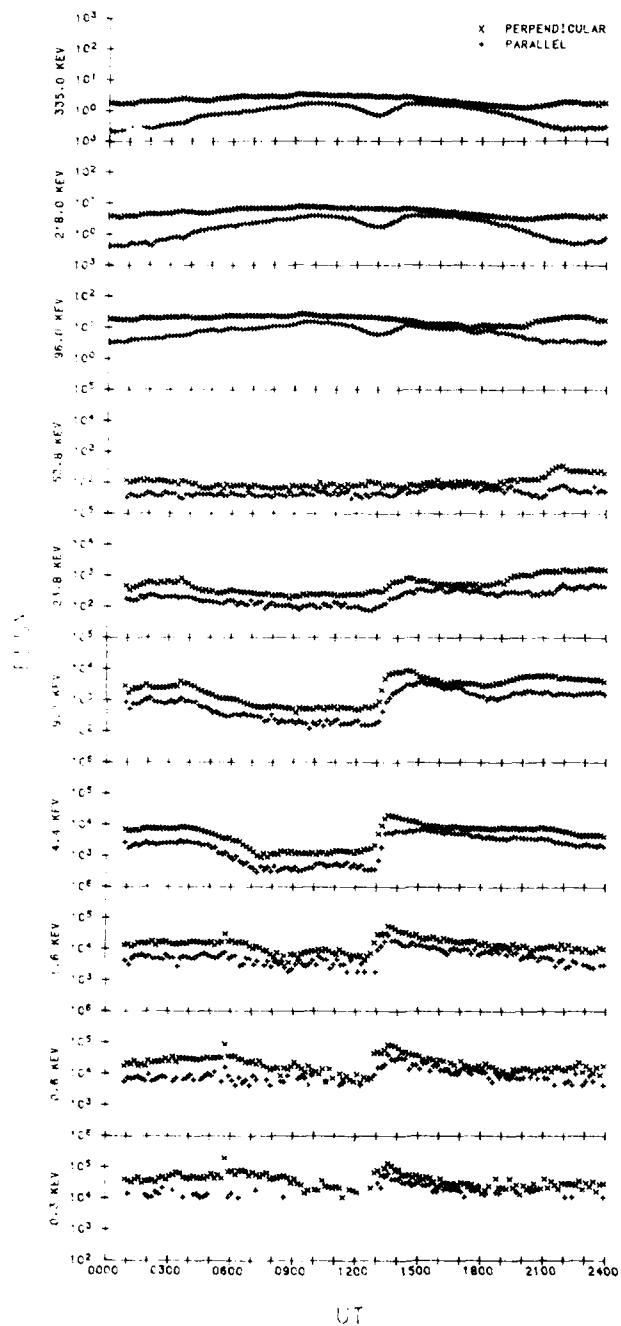
ELECTRONS
DAY 363



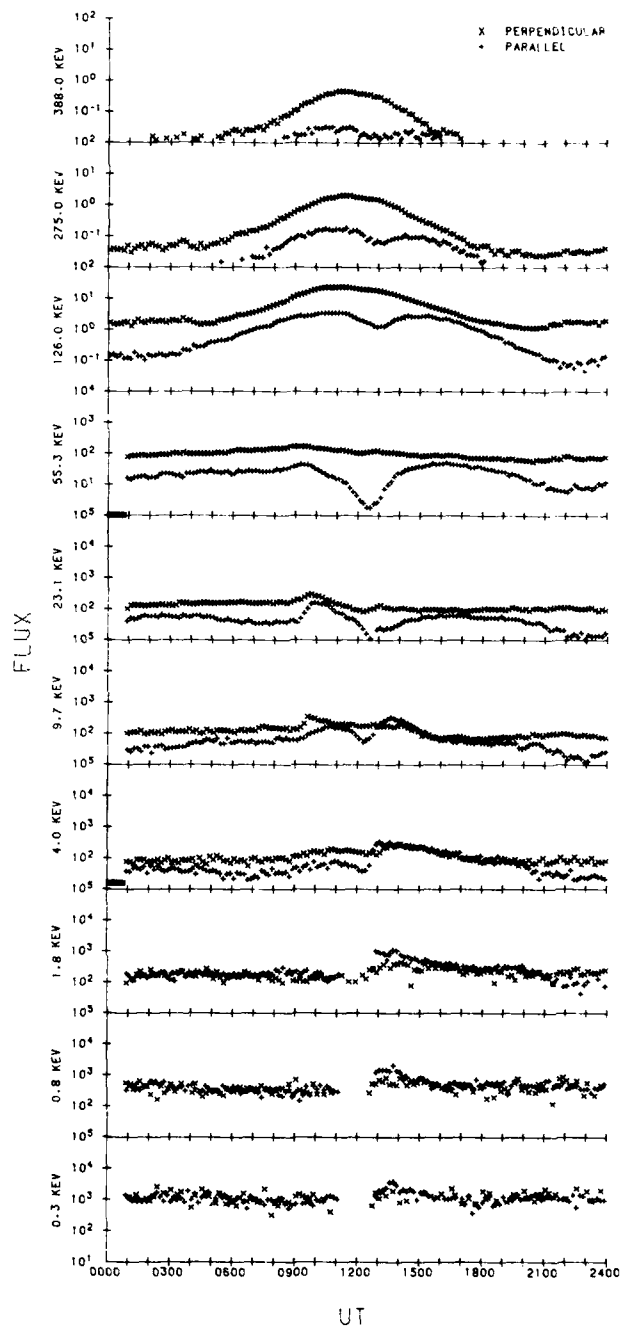
IONS
DAY 363



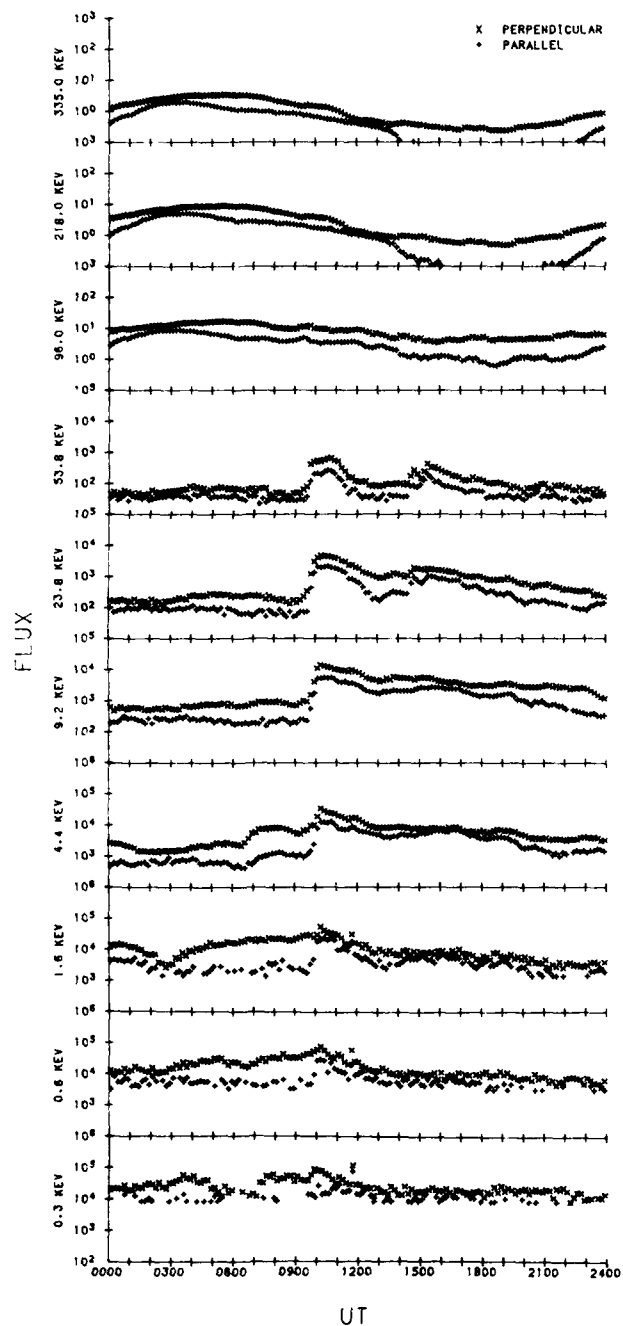
ELECTRONS DAY 18



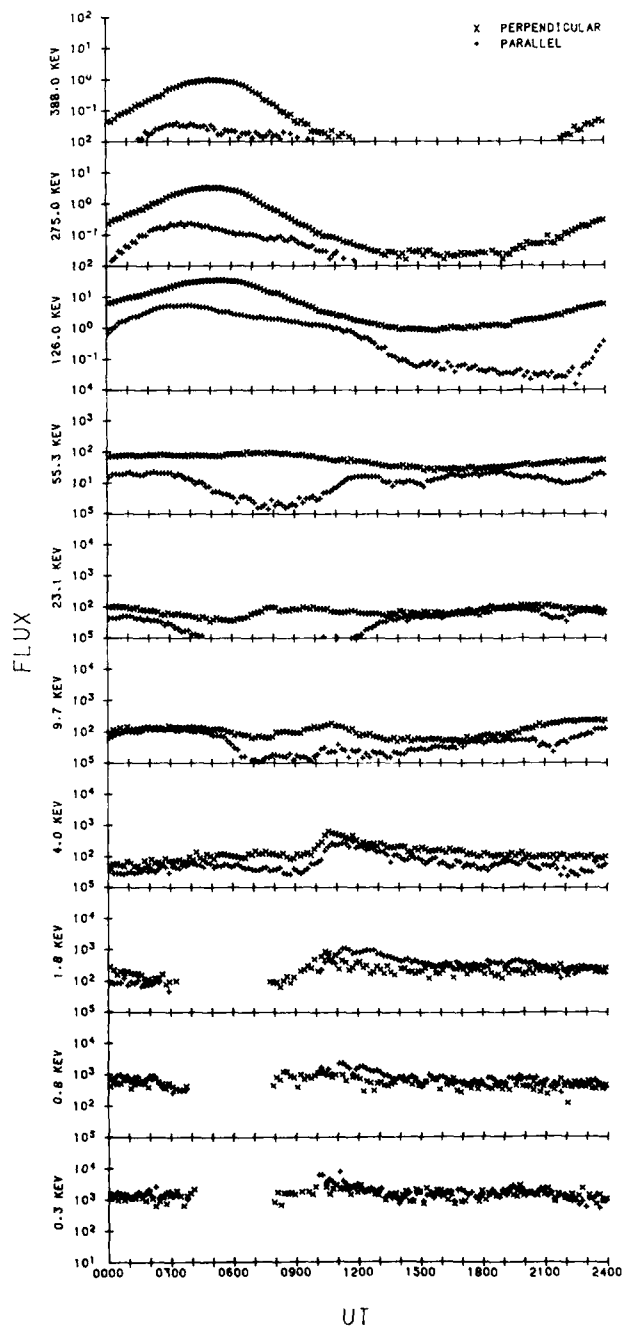
IONS DAY 18



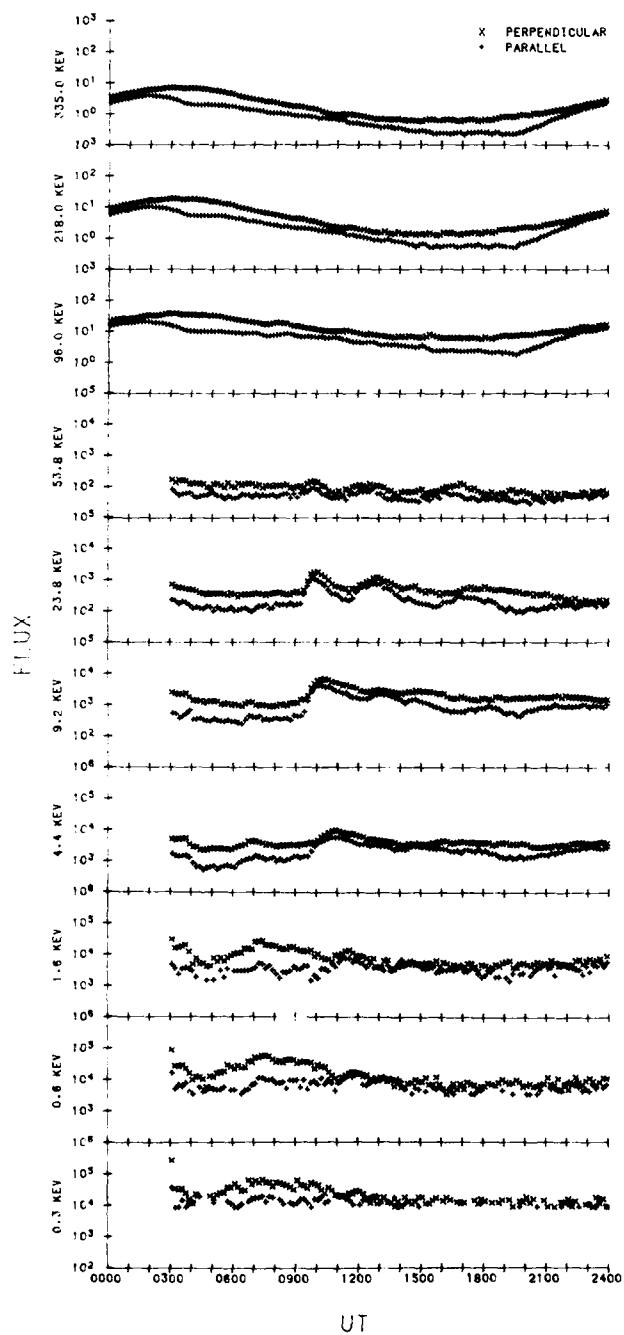
ELECTRONS
DAY 36



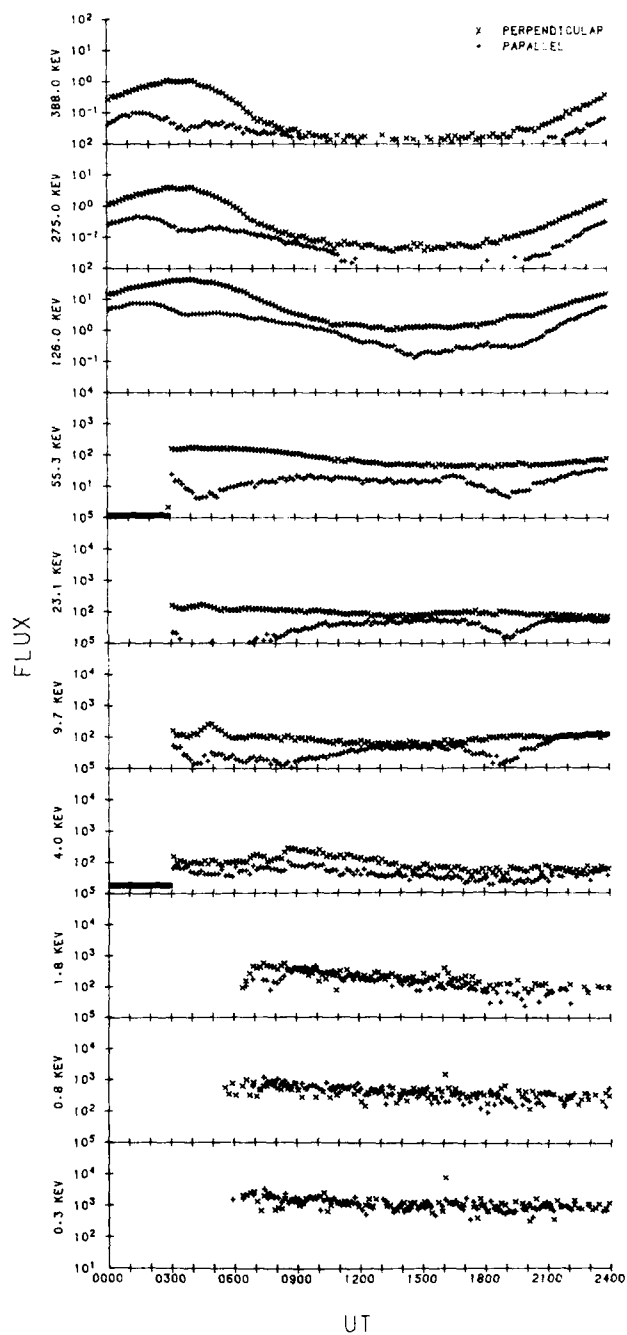
IONS
DAY 36



ELECTRONS
DAY 42



IONS
DAY 42



8. HIGH ENERGY ELECTRON DATA BASE, SC3

8.1 Instrument Description

The Lockheed SC3 High Energy Particle Spectrometer was built and operated under the direction of J.B. Reagan. The instrument is a solid-state spectrometer consisting of a long, narrow collimator that defines the 3° field-of-view, a solid-state stack of silicon detectors to stop the high-energy electrons and measure their total energy loss, an active anticoincidence collimator operating on high-energy particles that penetrate the detector stack, a plastic scintillator detector viewed by a photomultiplier tube to sense and reject energetic particles and Bremsstrahlung that penetrate the shielding walls, and associated control electronics. The sensors were energy calibrated prior to launch with several radioactive sources, and a weak source was flown on the instrument to monitor any changes in calibrations. The instrument has a 3° (FWHM) pitch angle resolution and a directional geometric factor of approximately $3 \times 10^{-3} \text{ cm}^2 \text{ sr}$.

On orbit the instrument was programmable to operate in eight different modes, plus a hardwired mode. One of the programmable modes (ELEC2) plus the hardwire mode (BACKUP) collected electron data. However, only the ELEC2 mode data are given here for electrons over the energy range of interest. Characteristics of the SC3 spectrometer in this mode are given in Reagan, et al.⁹ The dwell time in each mode was programmable at 8, 16, 32, or 64 s. This represents approximately 1/8 to 1 full spin. Data were received on computer tapes from Lockheed as 64-s averages of differential electron fluxes in electrons/($\text{cm}^2 \text{ s sr keV}$) within energy ranges of 634–1026, 1026–1419, 1419–2610 and 2603–4970 keV. The 64-s averages were calculated for whatever pitch angles the data were collected over and therefore some pitch angle scatter appears in the data set. The data were edited to remove spurious values.

8.2 Description of Data Presentation; SC3 High Energy Electrons

In each Figure the differential number flux of electrons for four energy ranges is plotted as a function of Universal Time (UT) for a 24-hour period. The number flux scale is logarithmic. At times the instrument is recording at background levels and these have not been edited out of the data.

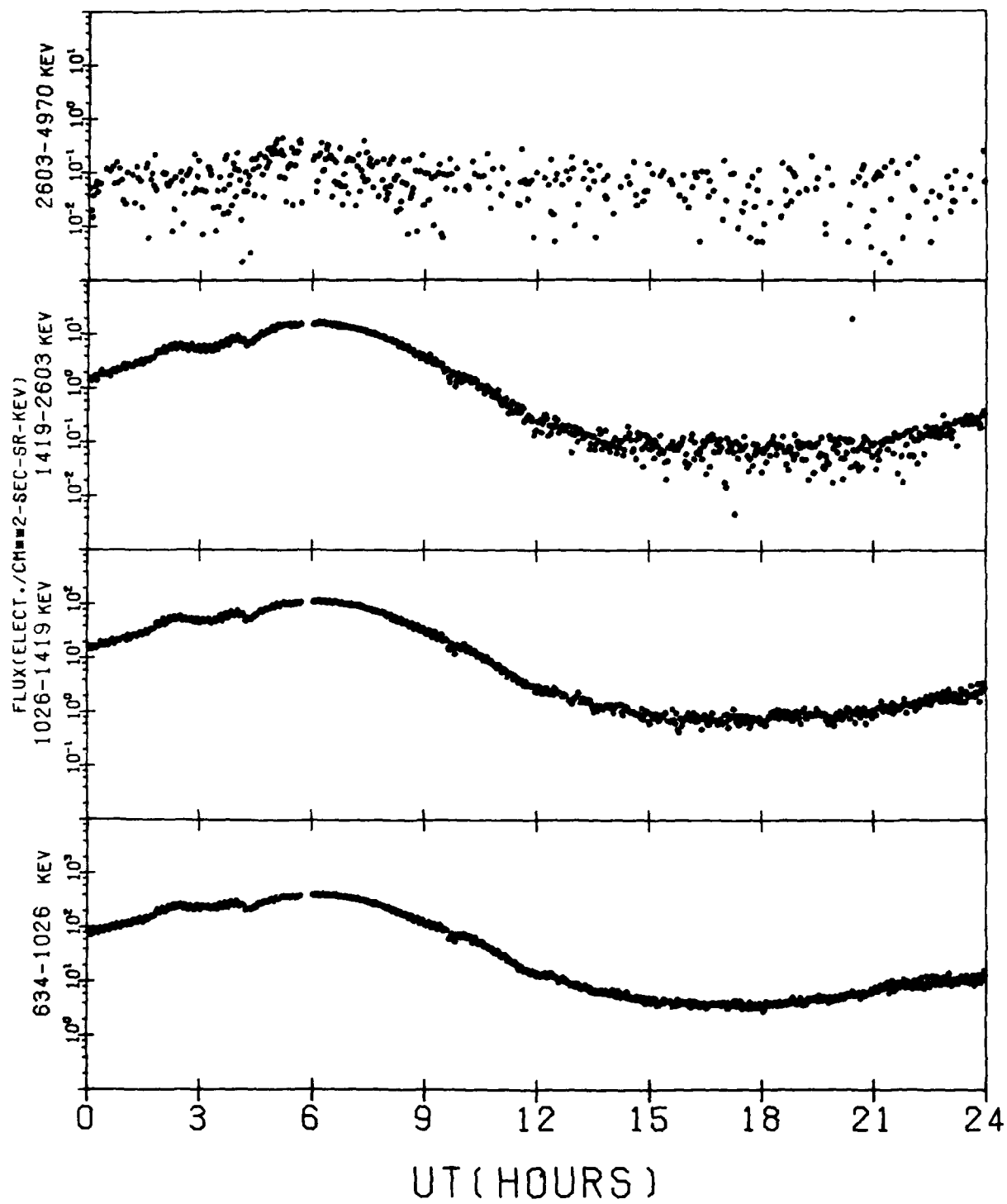
⁹Reagan, J.B., Nightingale, R.W., Gaines, E.E., Imhof, W.L., and Stassinopoulos, E.G. (1981) Outer zone energetic electron spectral measurements, *J. Spacecraft Rockets*, 18:83.

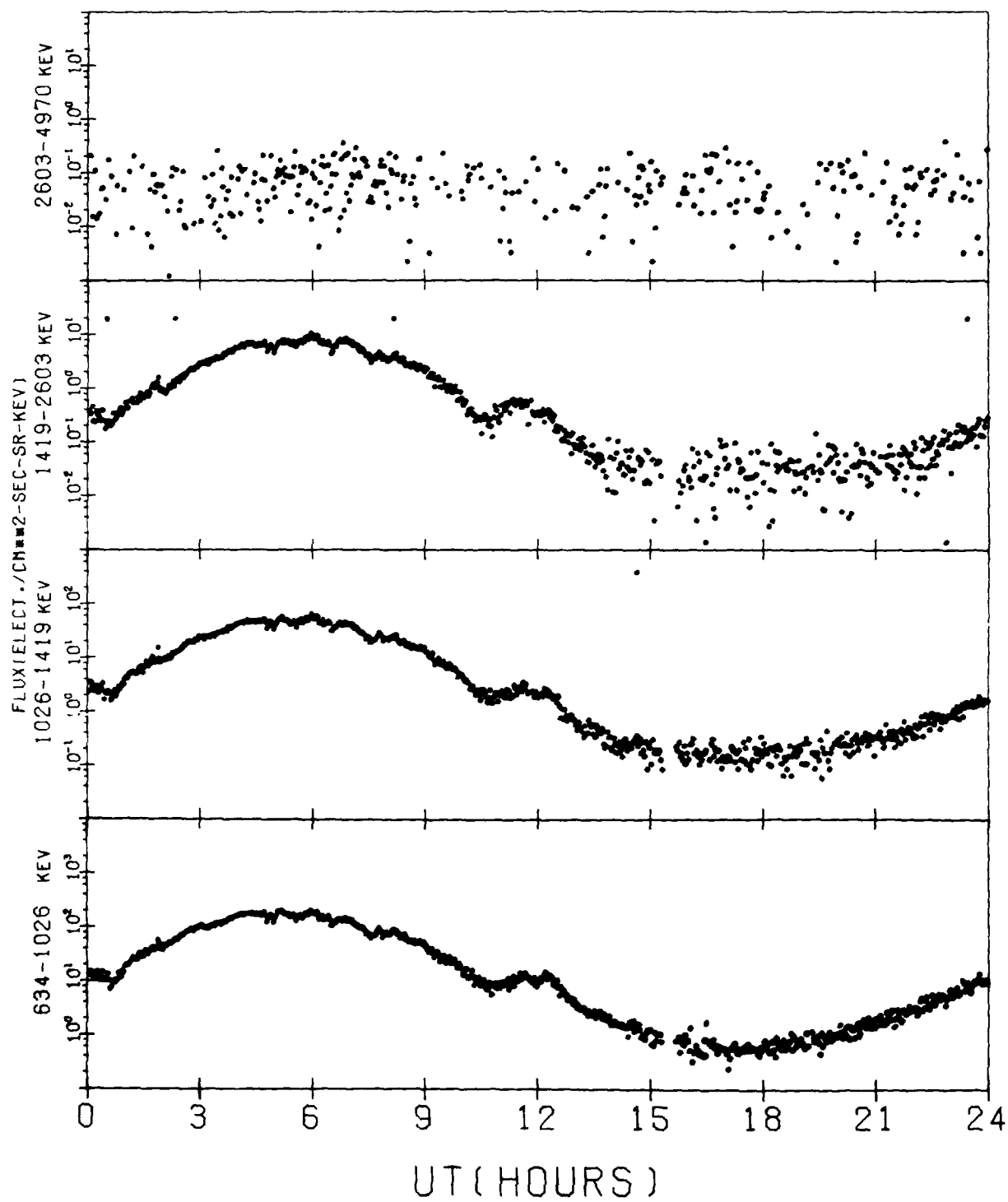
8.3 Calendar of Days for which the SC3 High Energy Electron Data are Presented

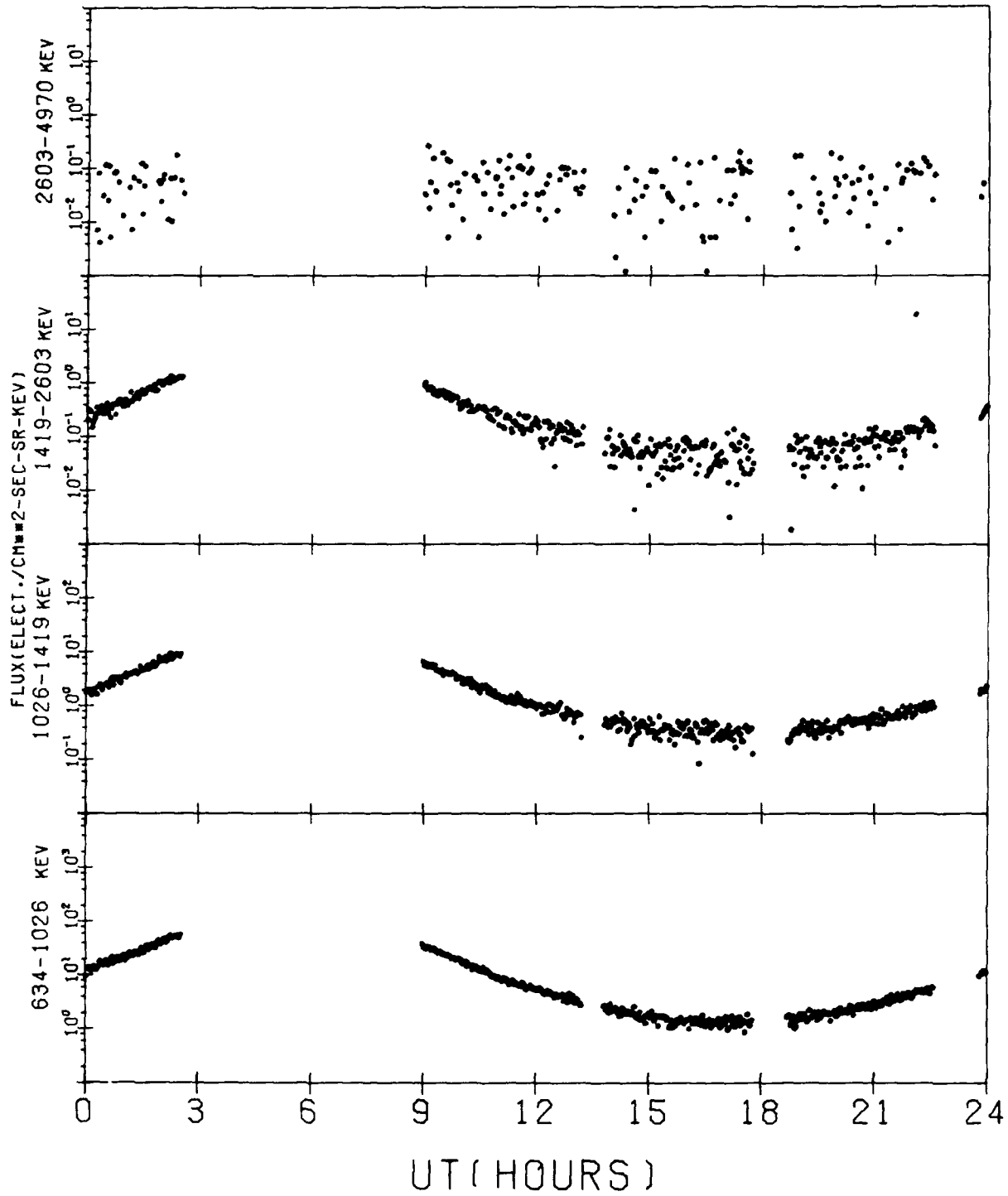
| 1979 | | | | | | | | | | | | 1980 | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|
| DAY | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | DAY |
| 1 | | | | 121 | | | | | | | | | | 1 |
| 2 | | | | | | | | | | | | | | 2 |
| 3 | | | 093 | | | | | | | | | | | 3 |
| 4 | | | 094 | | | | | | | | | 004 | | 4 |
| 5 | | | 095 | | 156 | | | | 278 | | | | 036 | 5 |
| 6 | | | | | 157 | | | | 279 | | | | 037 | 6 |
| 7 | | | | 127 | 158 | 188 | | | 280 | | 341 | | | 7 |
| 8 | | | | | | | | | 281 | | | | | 8 |
| 9 | | | | | 160 | | | | 282 | | | | | 9 |
| 10 | | | | | | | | | | | | | | 10 |
| 11 | 042 | | | | | | | | | | | | 042 | 11 |
| 12 | 043 | | | | | | | | | | | 012 | | 12 |
| 13 | 044 | | 103 | | | | 225 | | | 317 | | | | 13 |
| 14 | 045 | | | | | | 226 | | | | | | | 14 |
| 15 | 046 | | | | 166 | | | | | 319 | | | 046 | 15 |
| 16 | 047 | | | | | | | | | | | | 047 | 16 |
| 17 | | | | | | | | | | | 351 | | | 17 |
| 18 | | | 108 | 138 | | | | 261 | | | | 018 | | 18 |
| 19 | | | | | | 200 | | 262 | | | | | | 19 |
| 20 | | | 110 | | | | 232 | | | | | | | 20 |
| 21 | 052 | 080 | 111 | | 172 | | | 264 | | | | | | 21 |
| 22 | 053 | | | 142 | | | | | | | | | | 22 |
| 23 | | | | | | | | | | | | | | 23 |
| 24 | | | 114 | 144 | | | | | | 328 | | | | 24 |
| 25 | | | 115 | 145 | | 206 | | | | 329 | 359 | | | 25 |
| 26 | | | | 146 | | | | | | | | | | 26 |
| 27 | | | | | | | | | | | 361 | 027 | | 27 |
| 28 | 087 | | | | | | | 271 | 301 | | | 028 | | 28 |
| 29 | 088 | | | 149 | 180 | | 241 | 272 | | | 363 | | | 29 |
| 30 | | | 120 | | | | | 273 | | | | | | 30 |
| 31 | | | | | | | | | | | | | | 31 |

8.4 Data Presentation; SC3 High Energy Electron Data

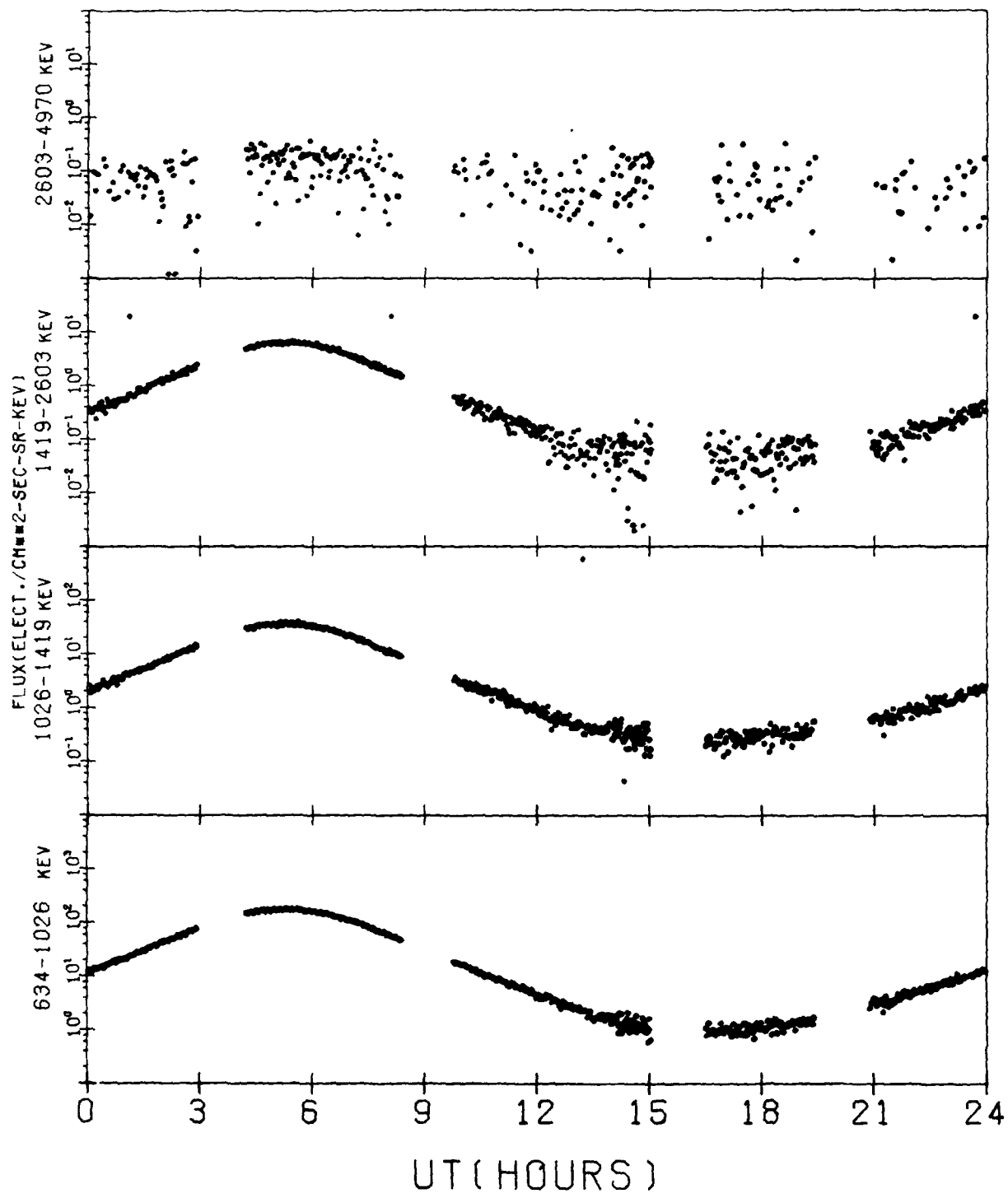
SCATHA SC3 DAY 79042

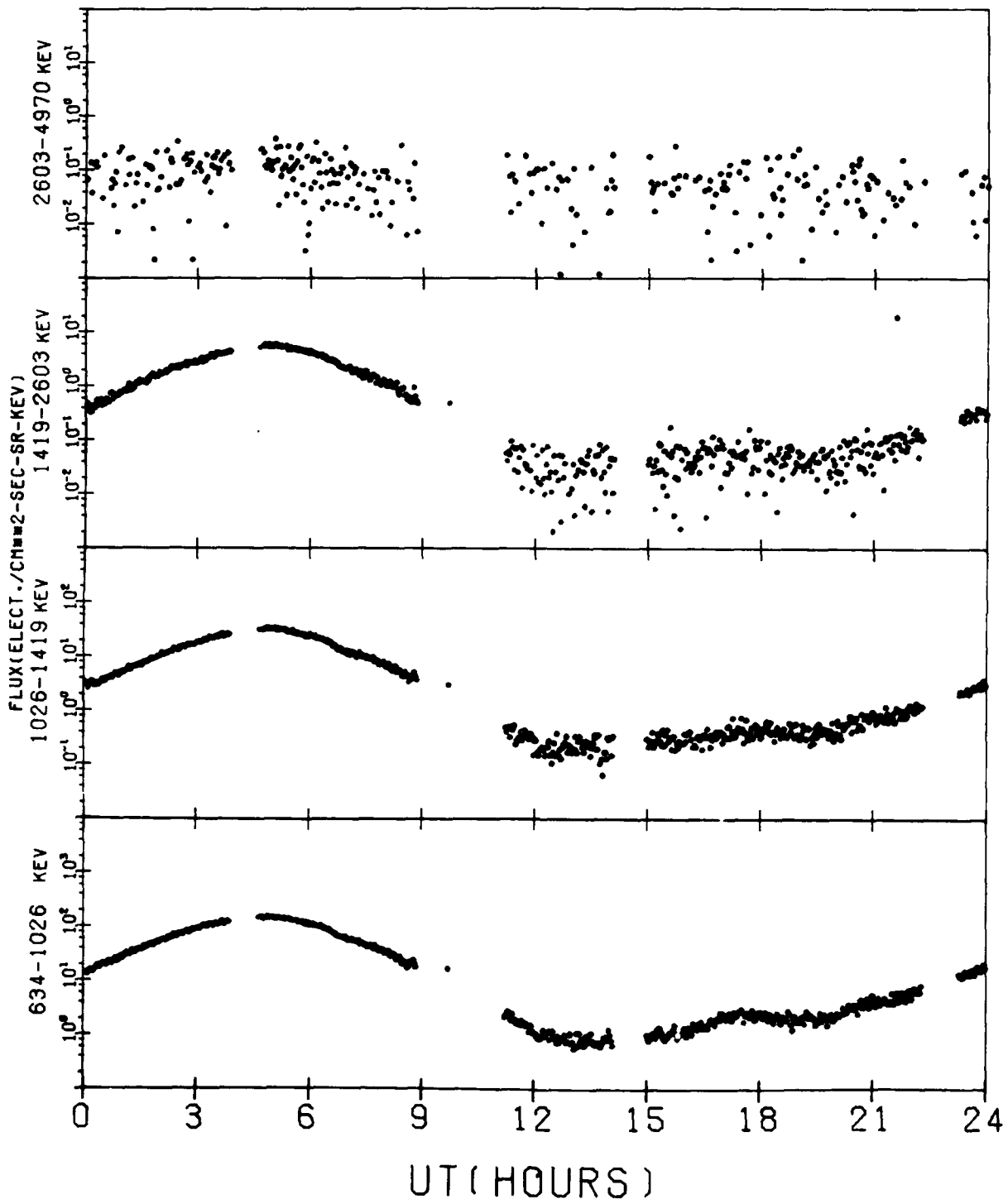




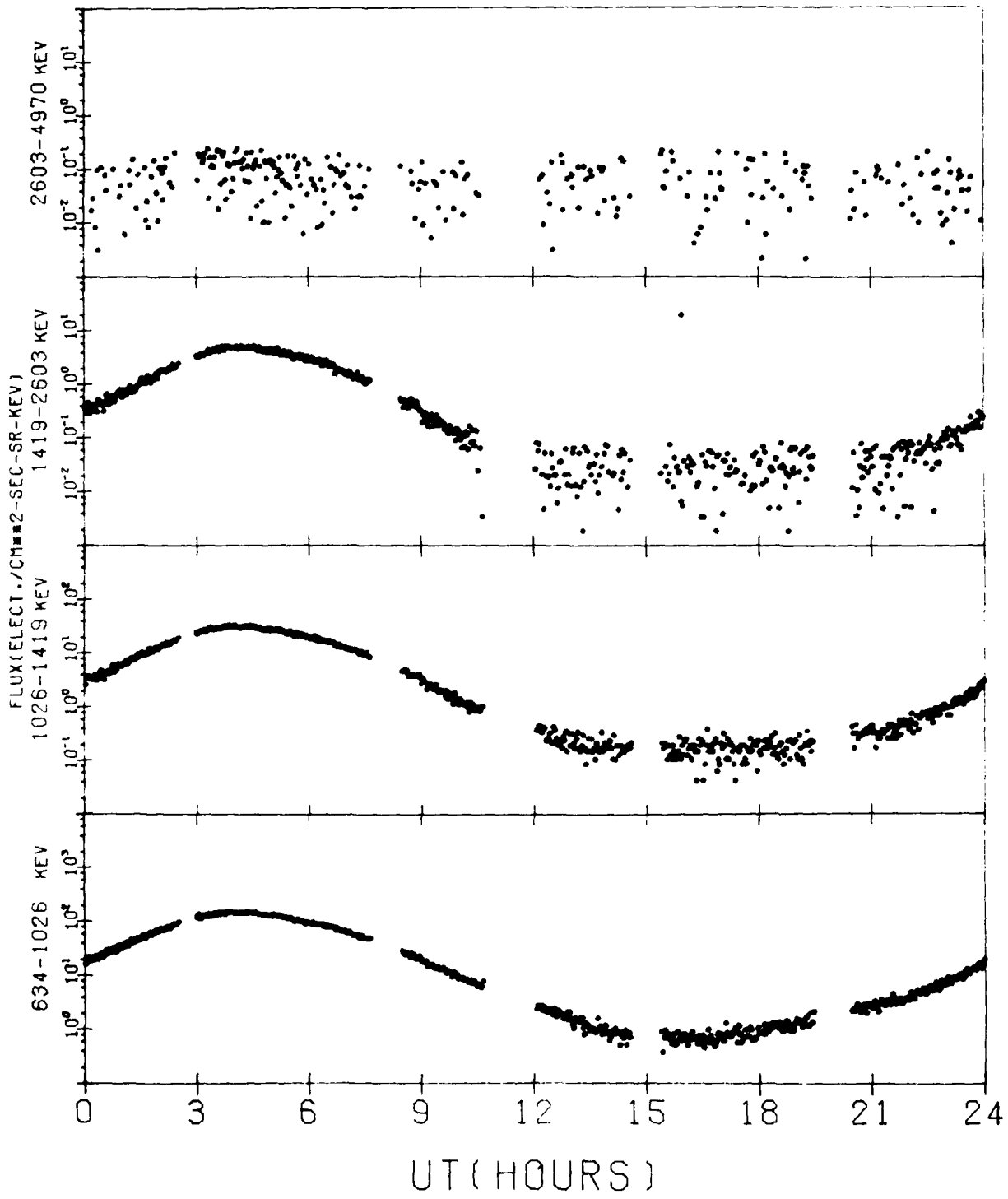


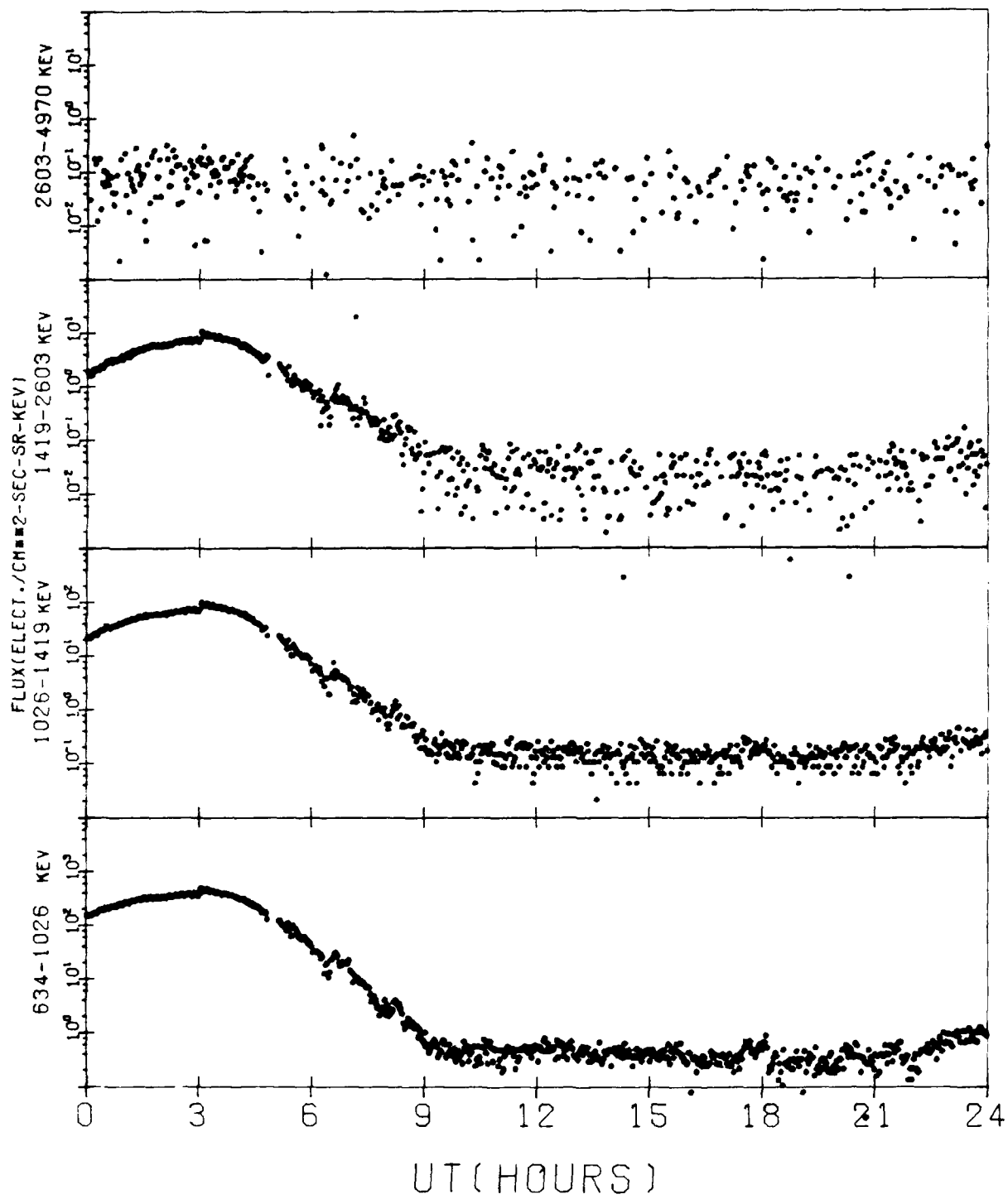
SCATHA SC3 DAY 79045



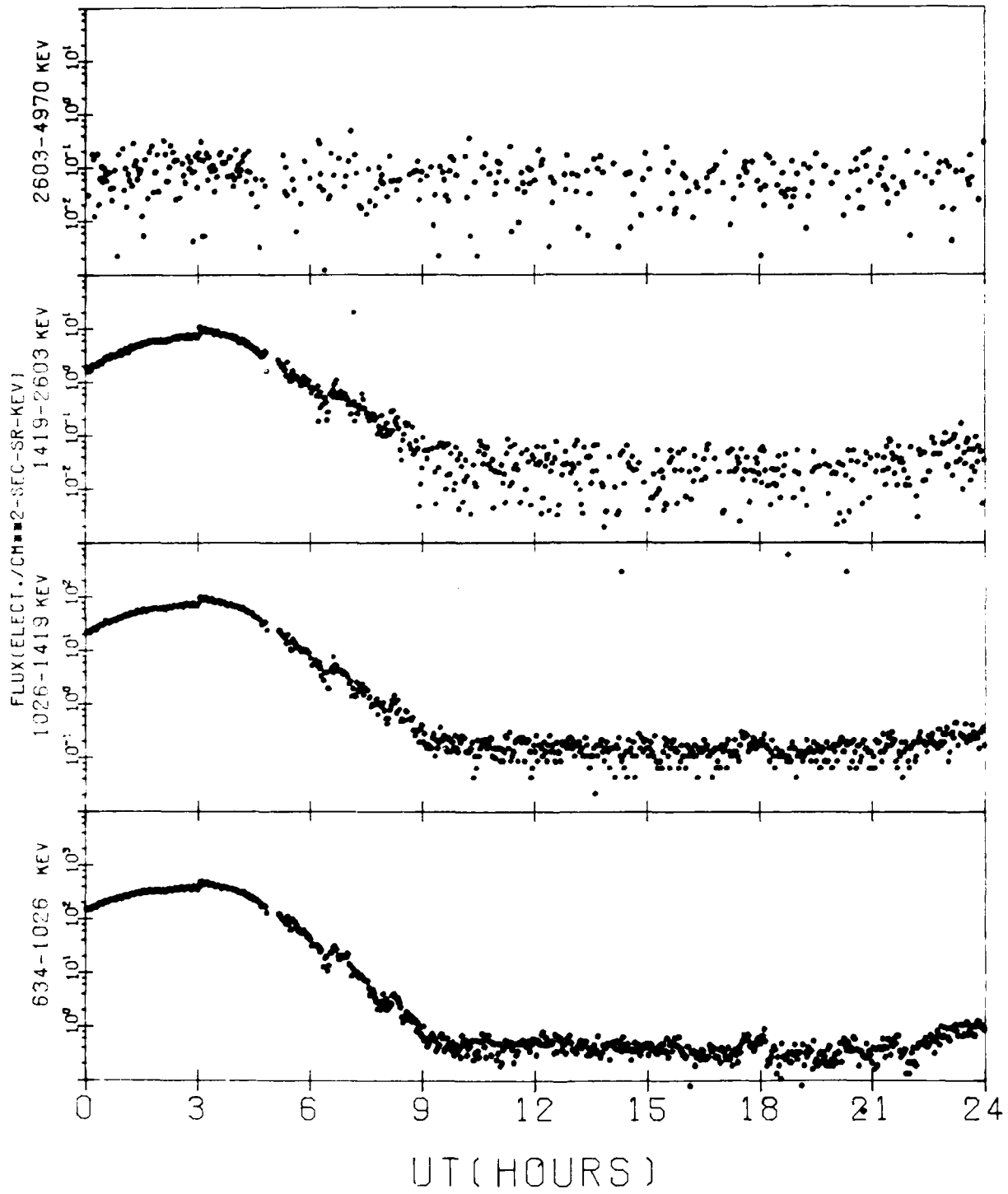


SCATHA SC3 DAY 79047

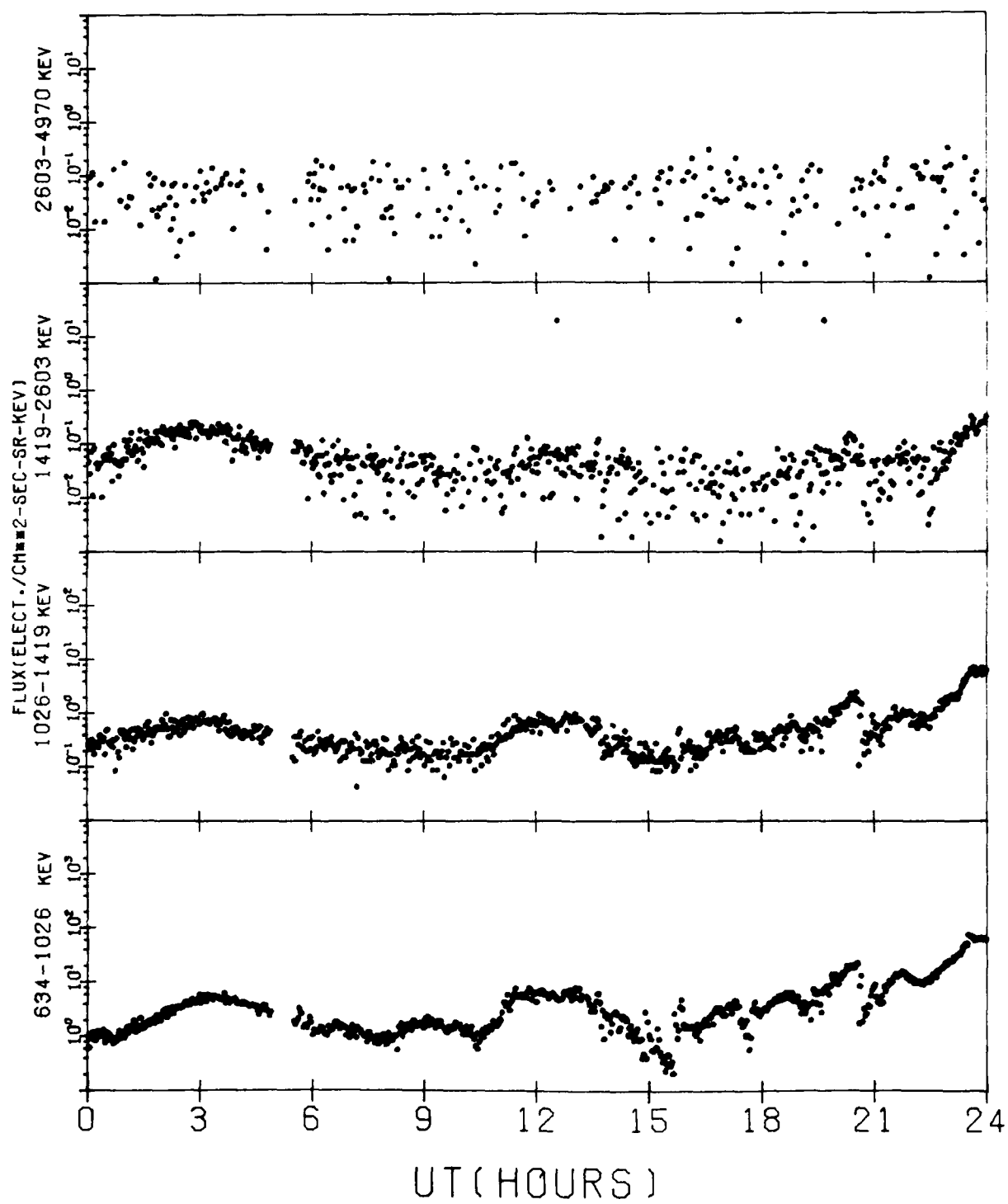




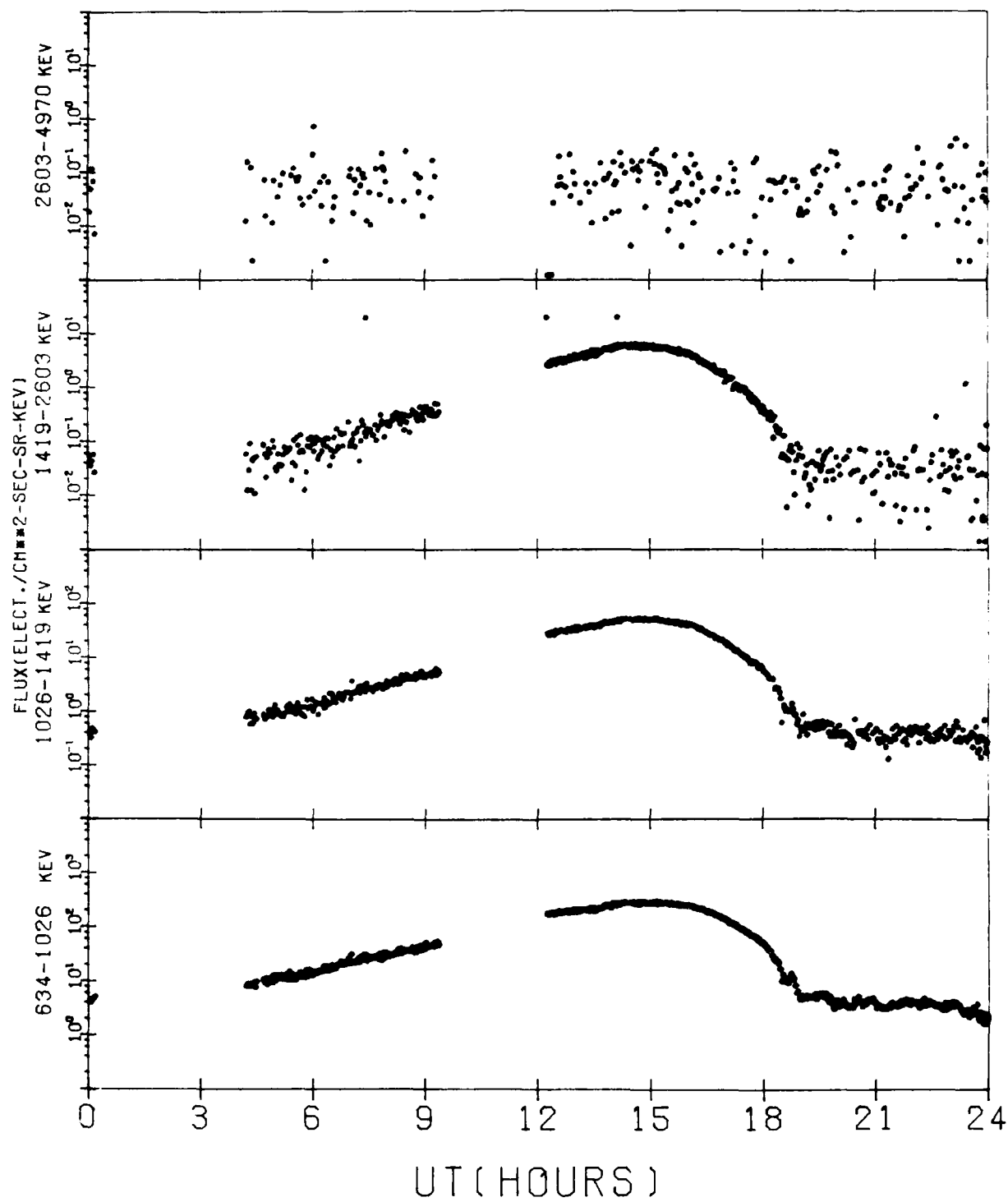
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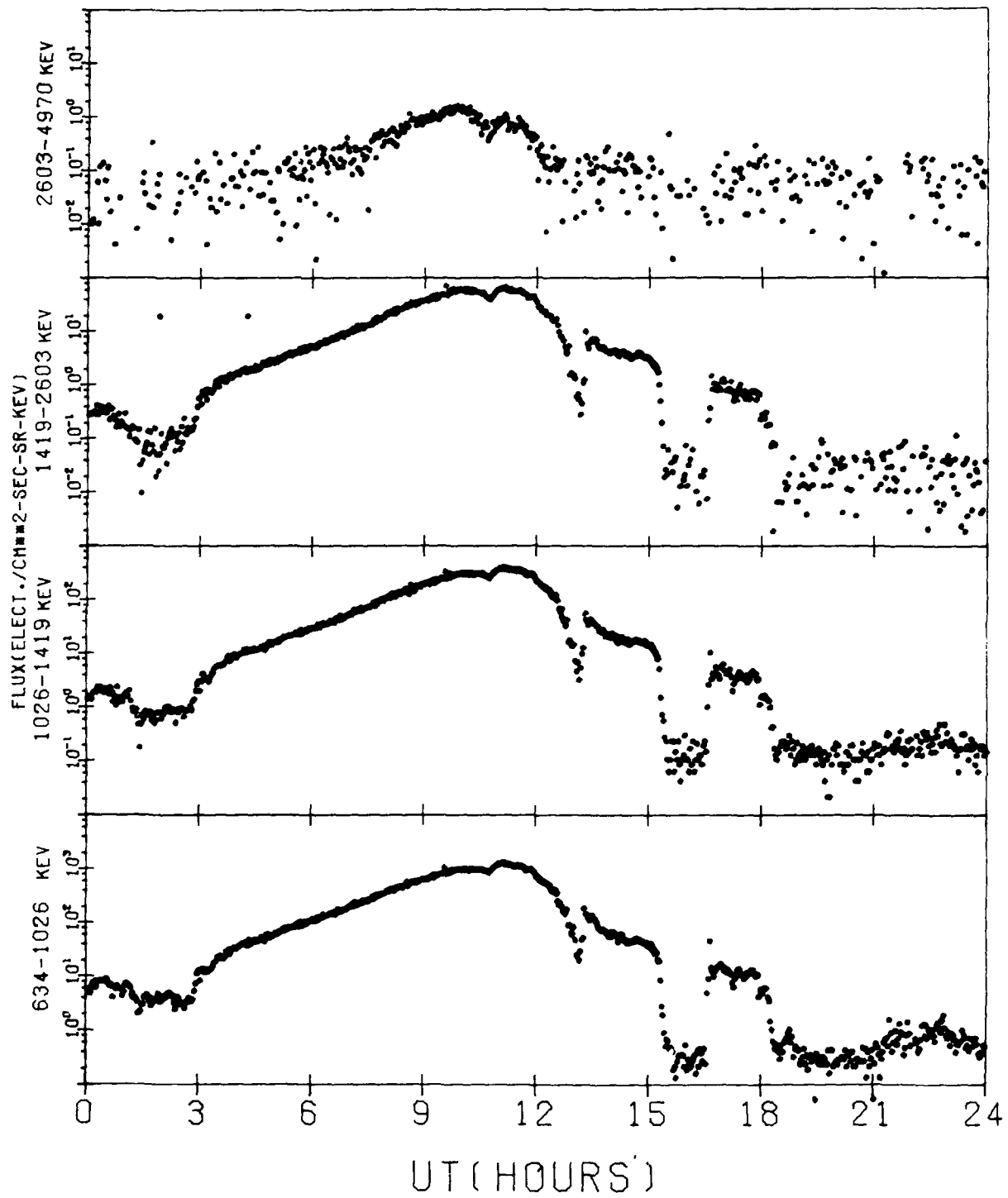
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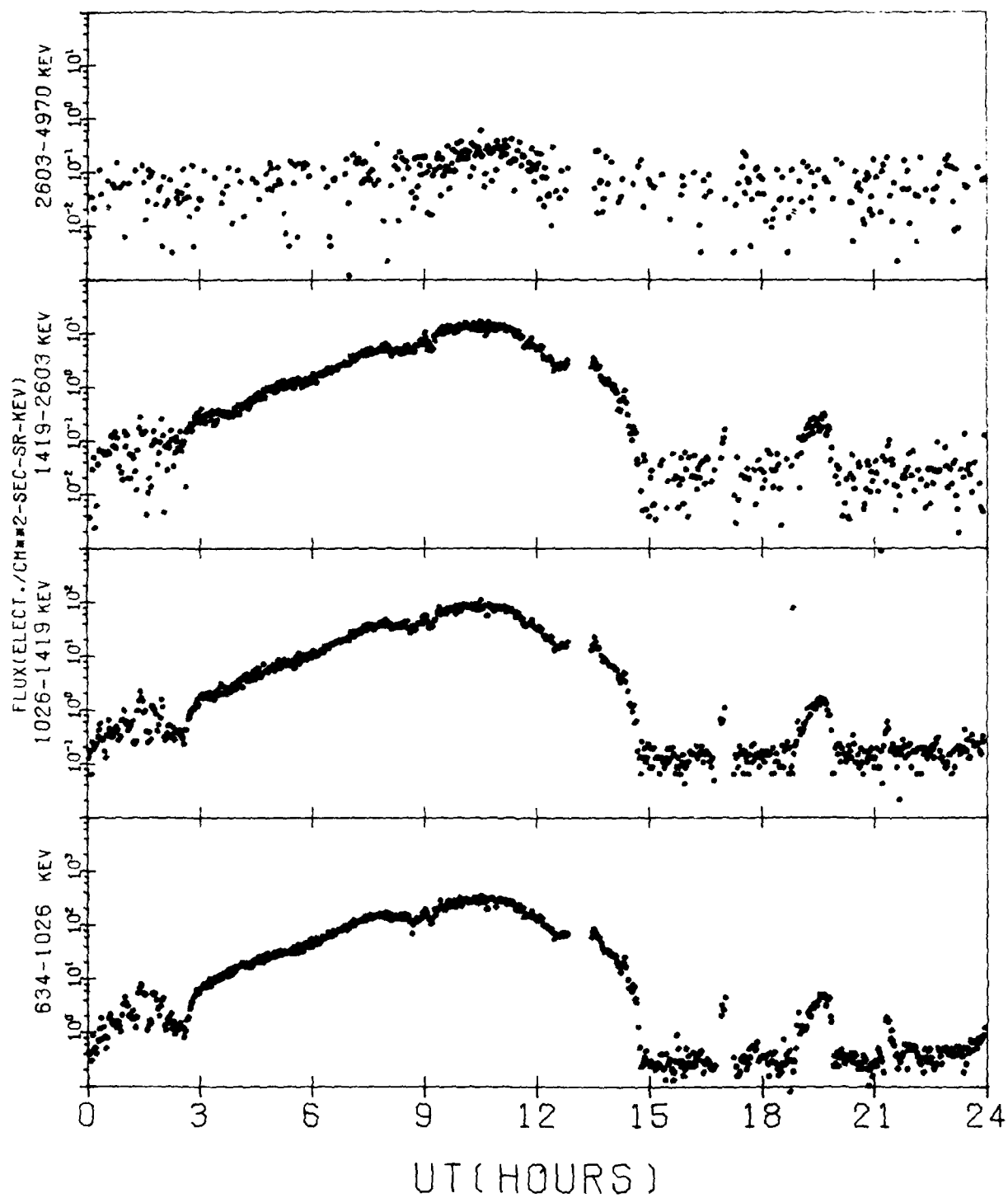
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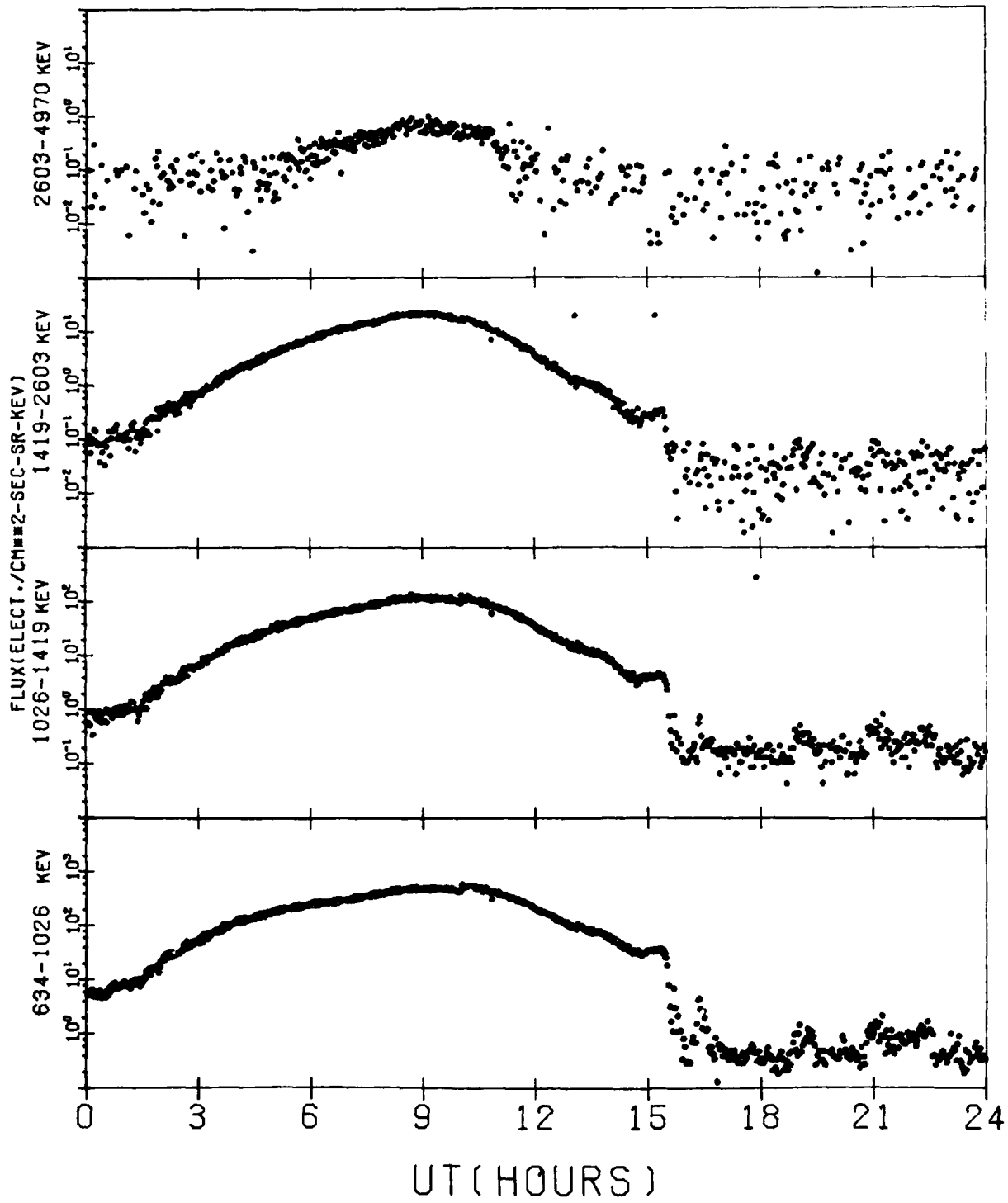
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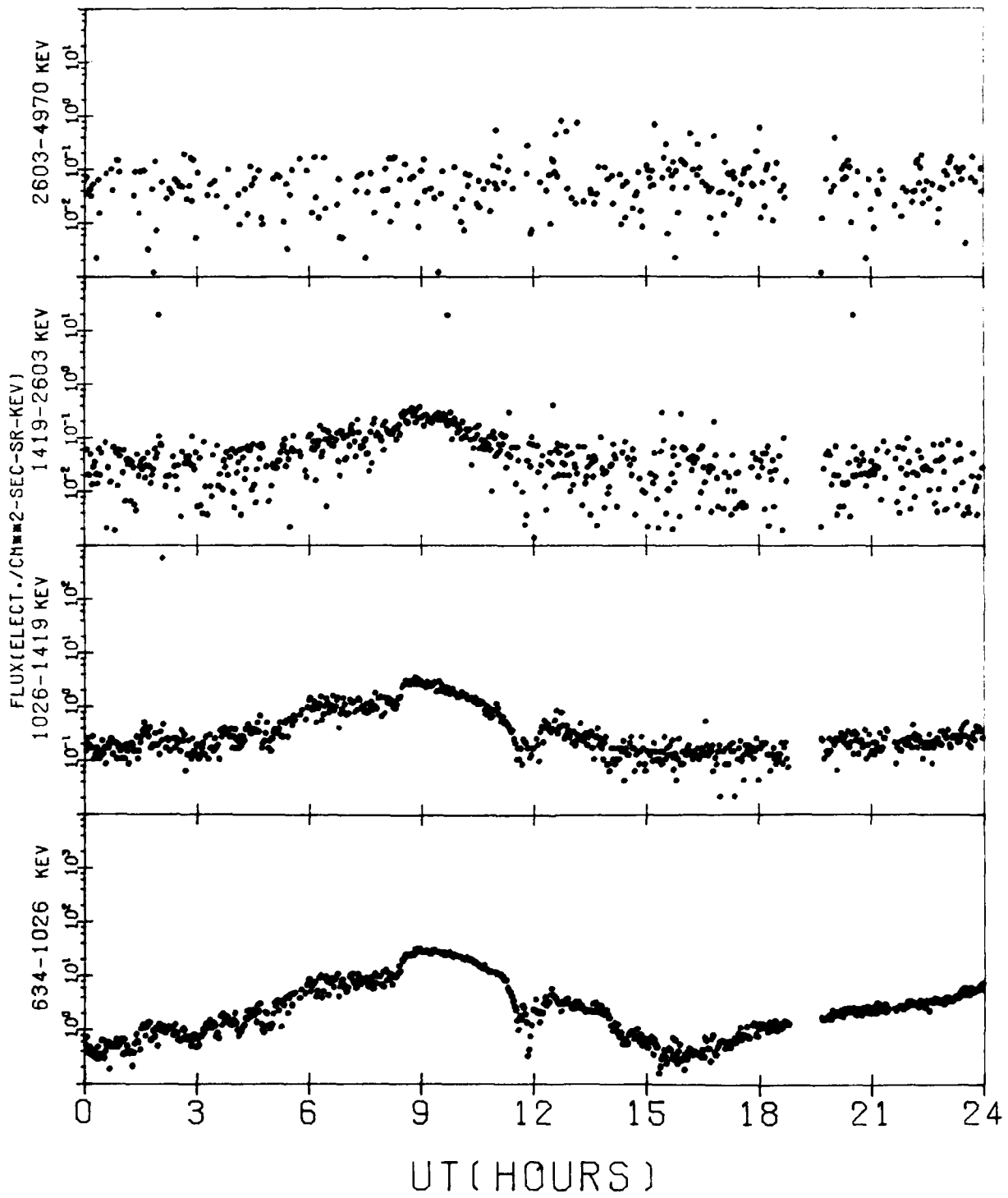
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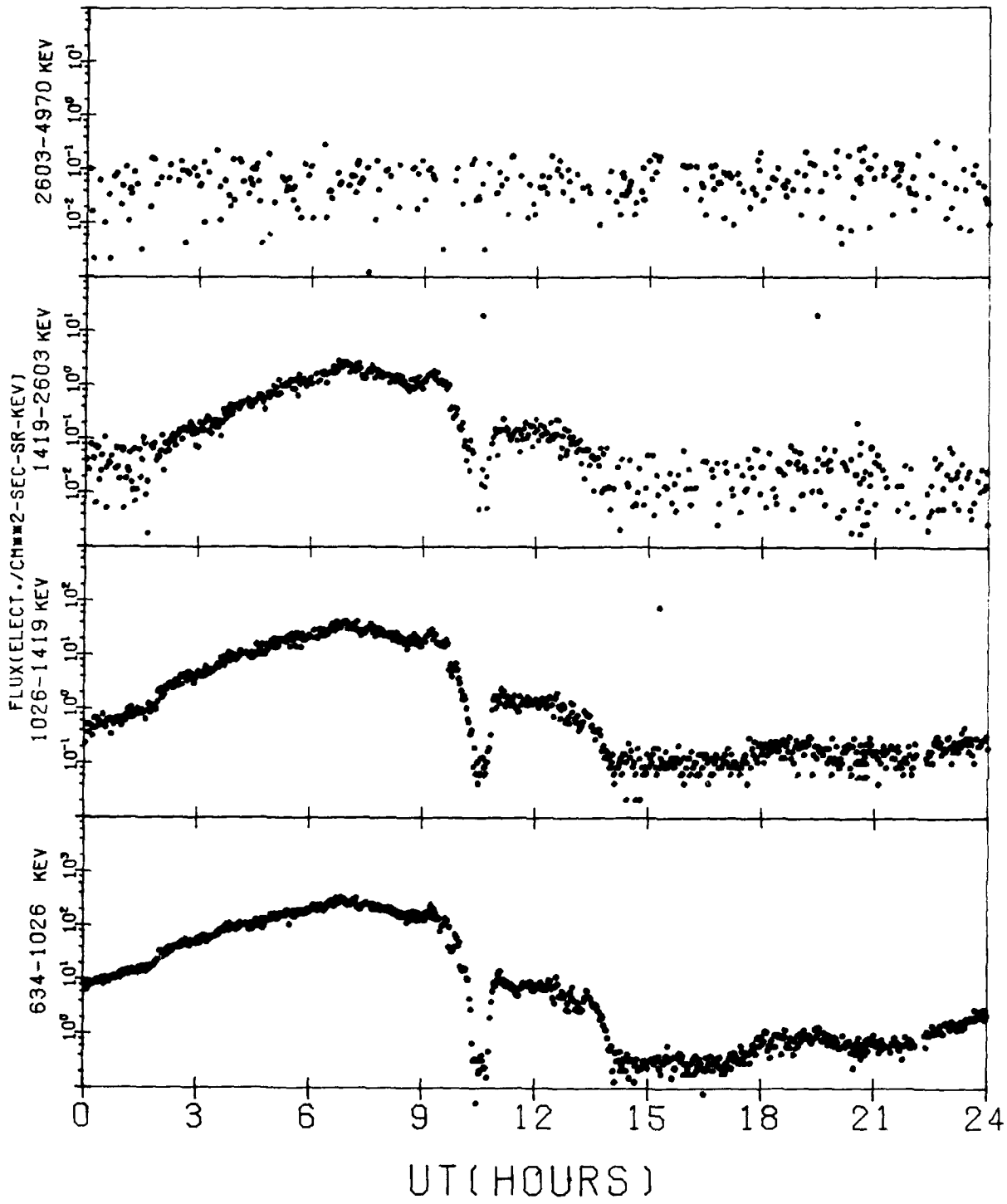
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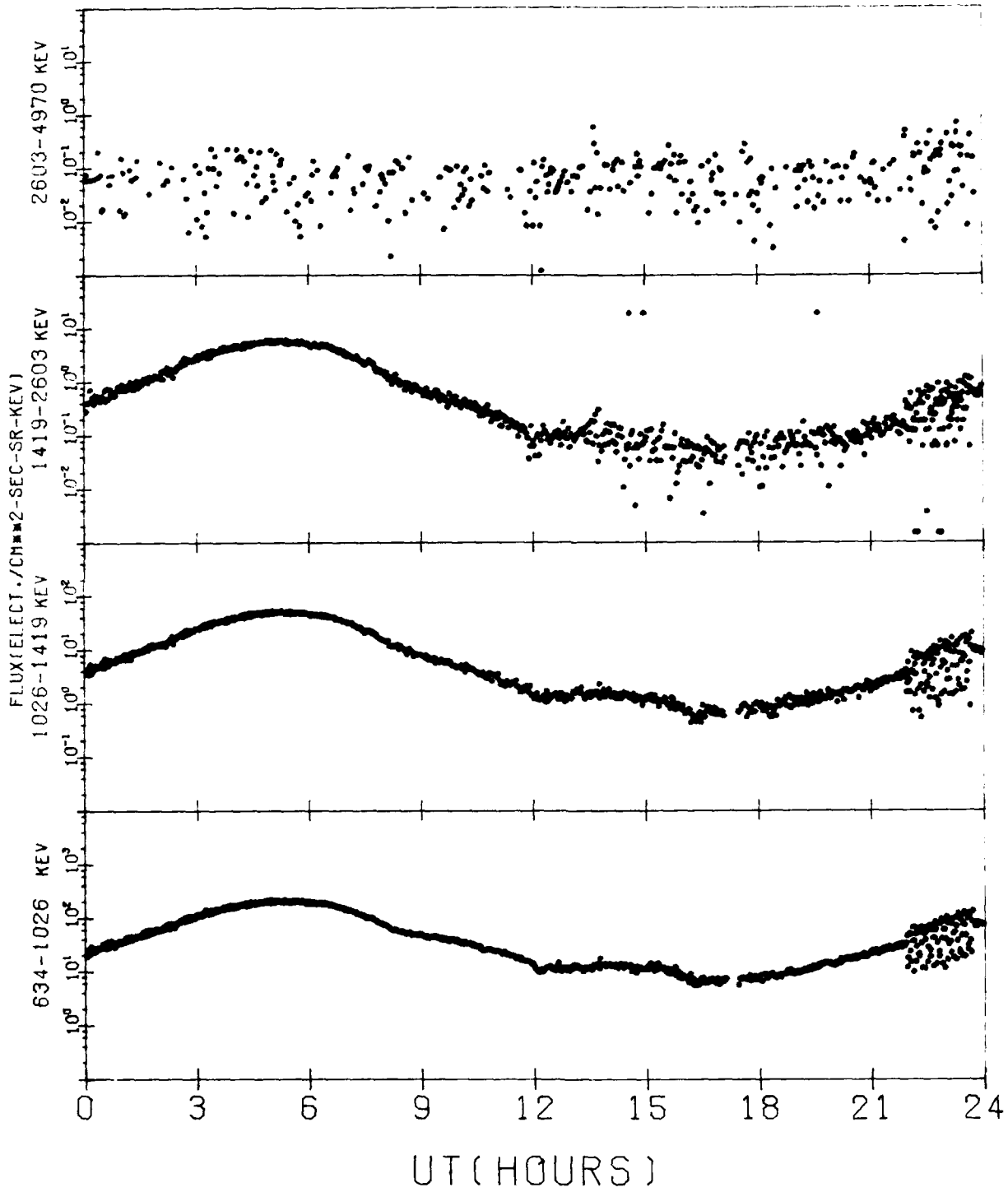
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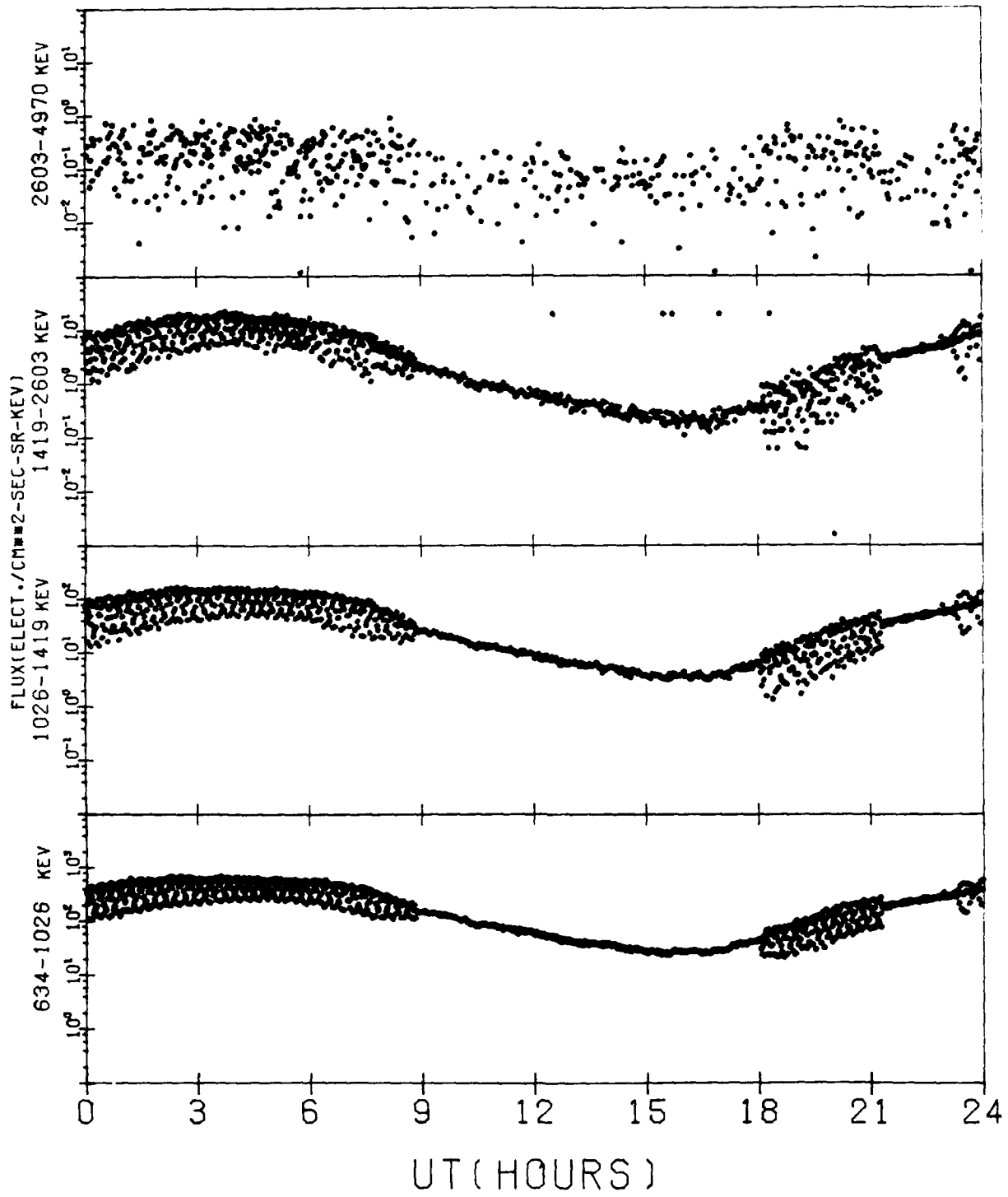
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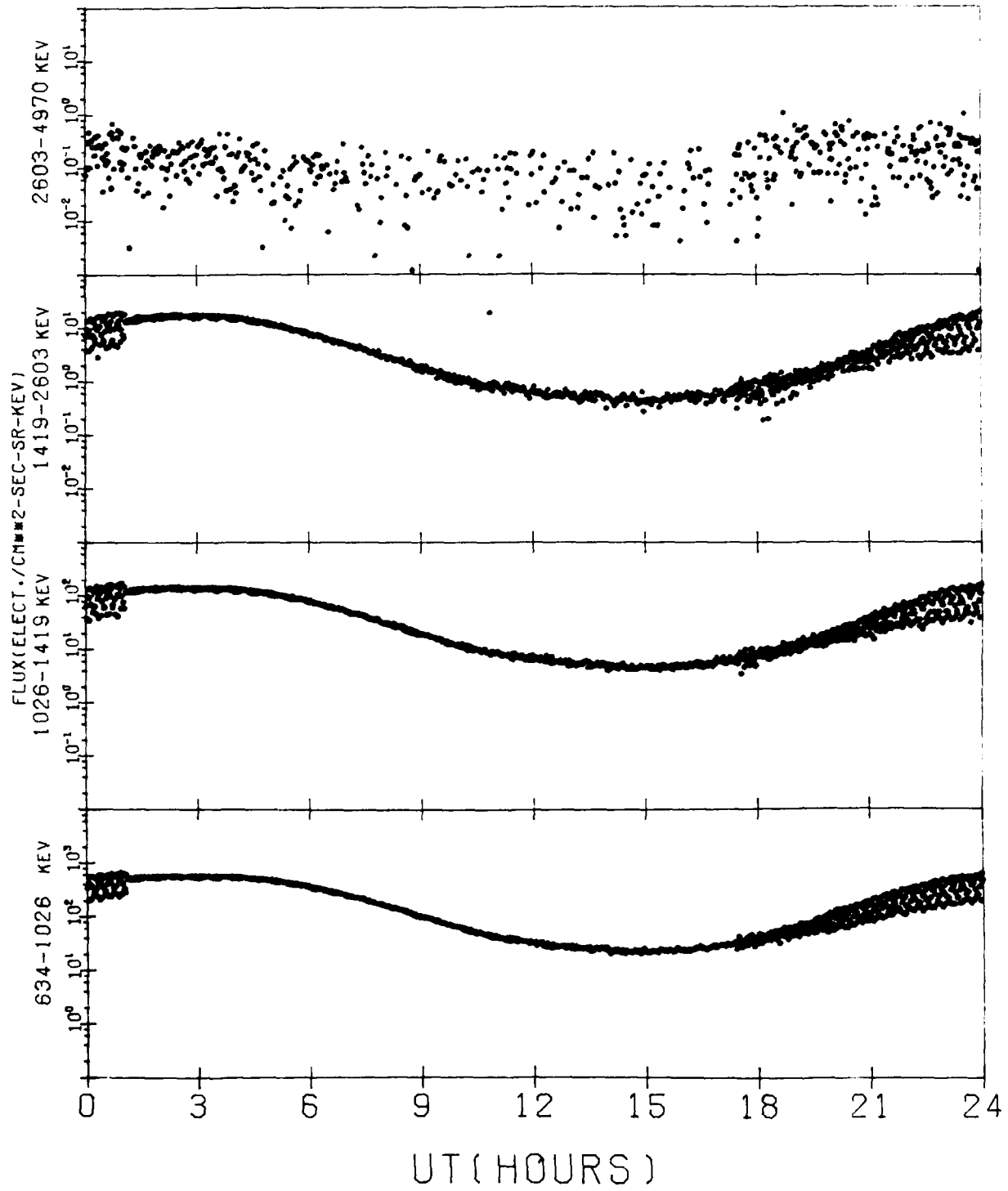
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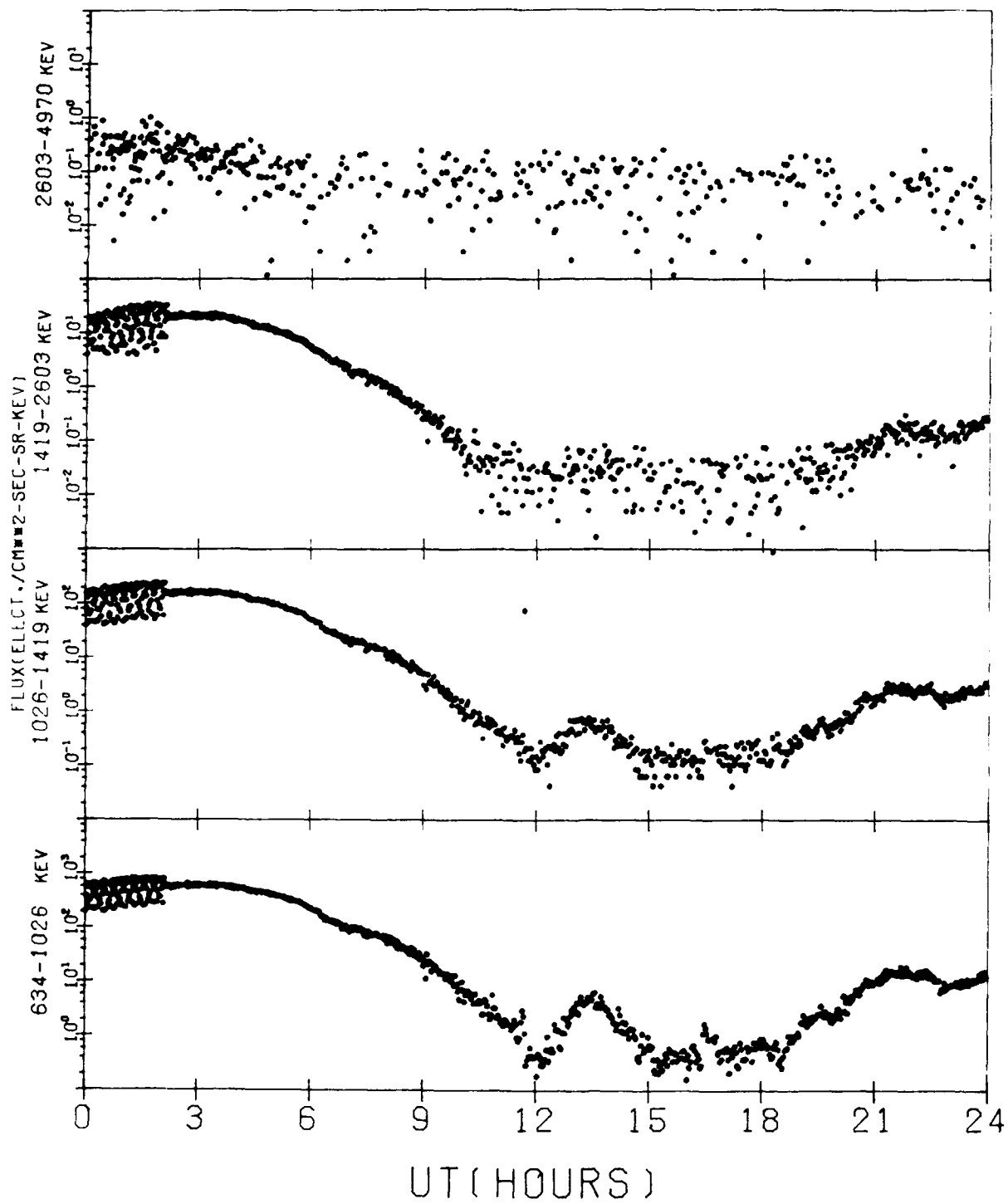
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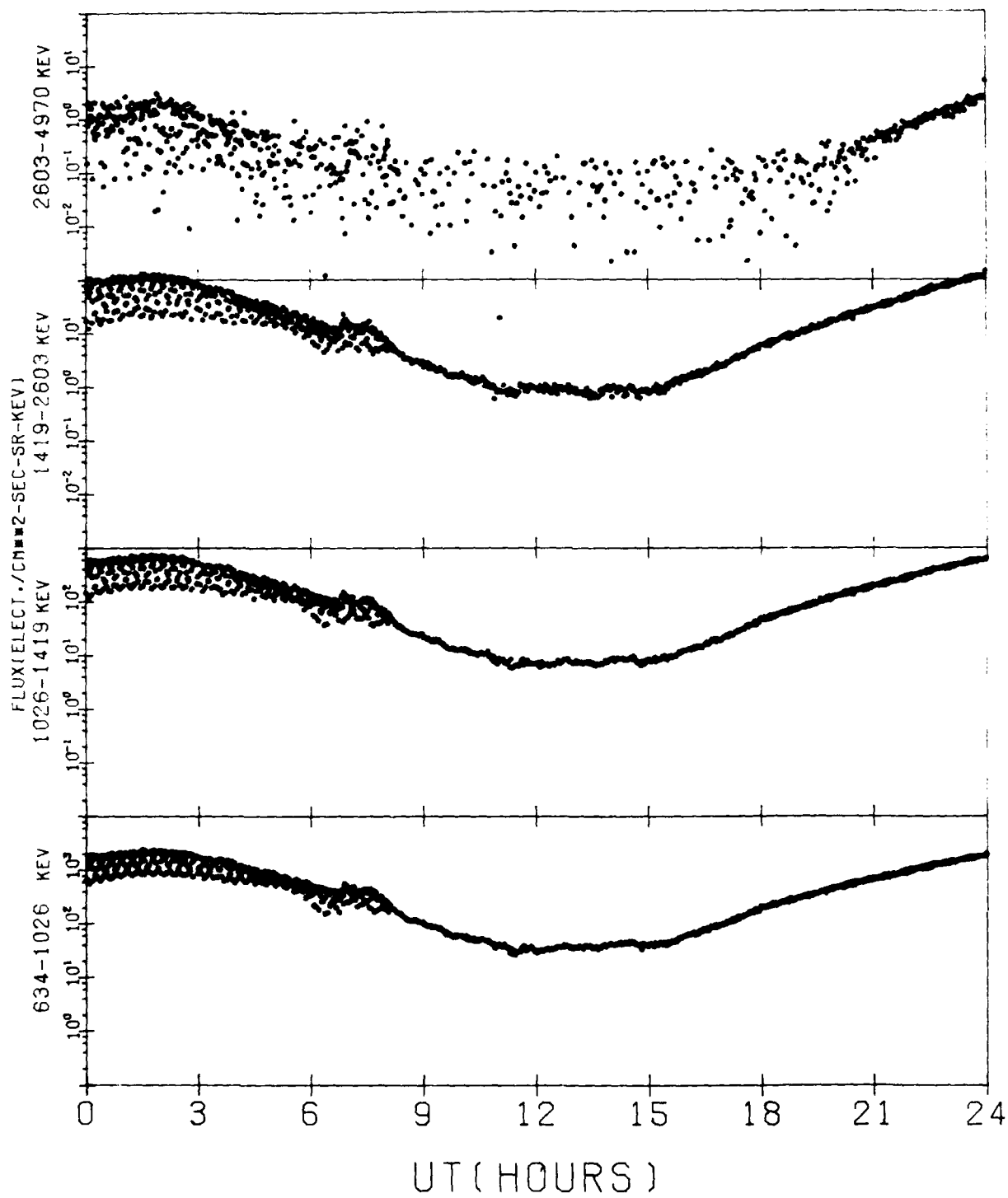
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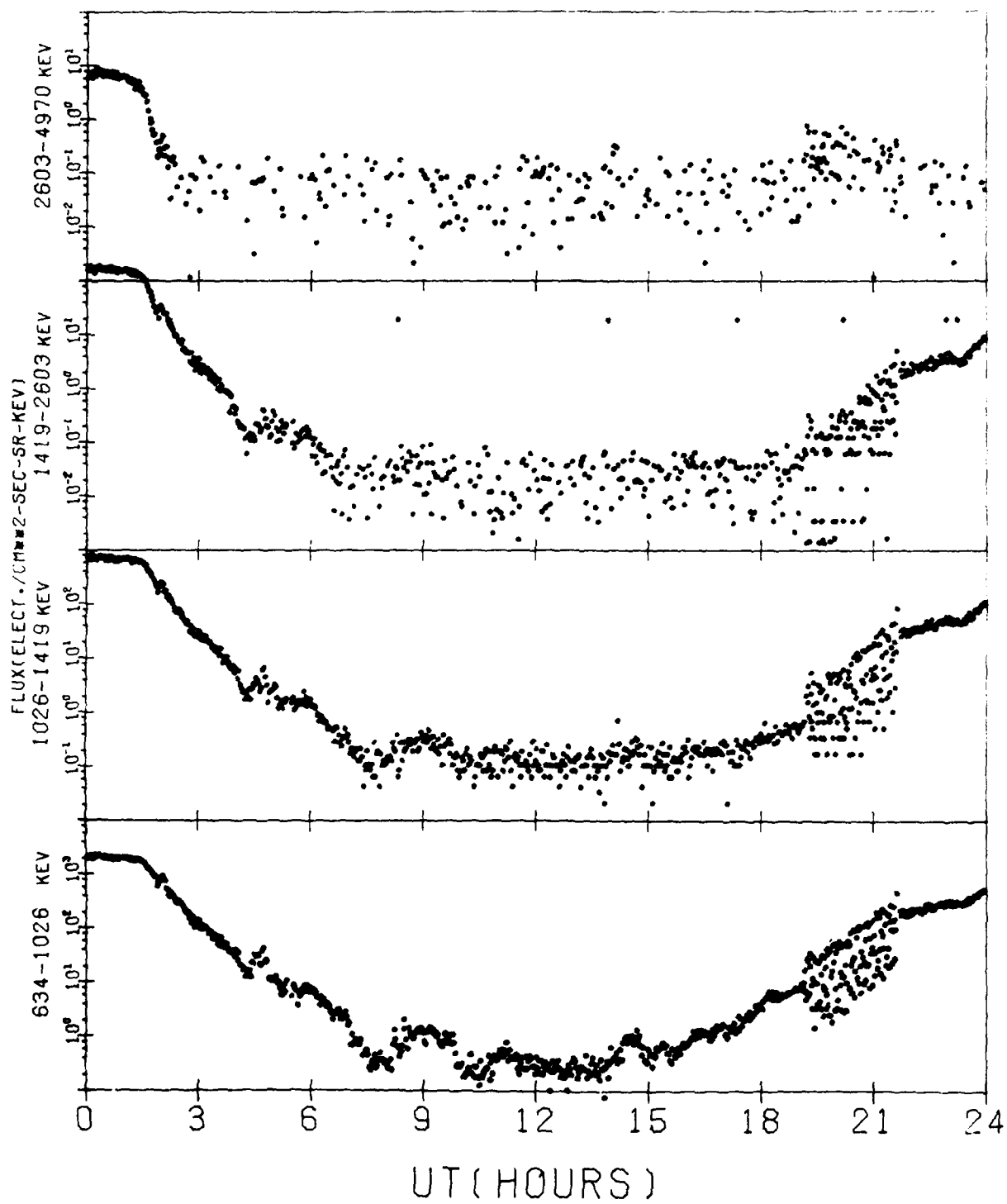
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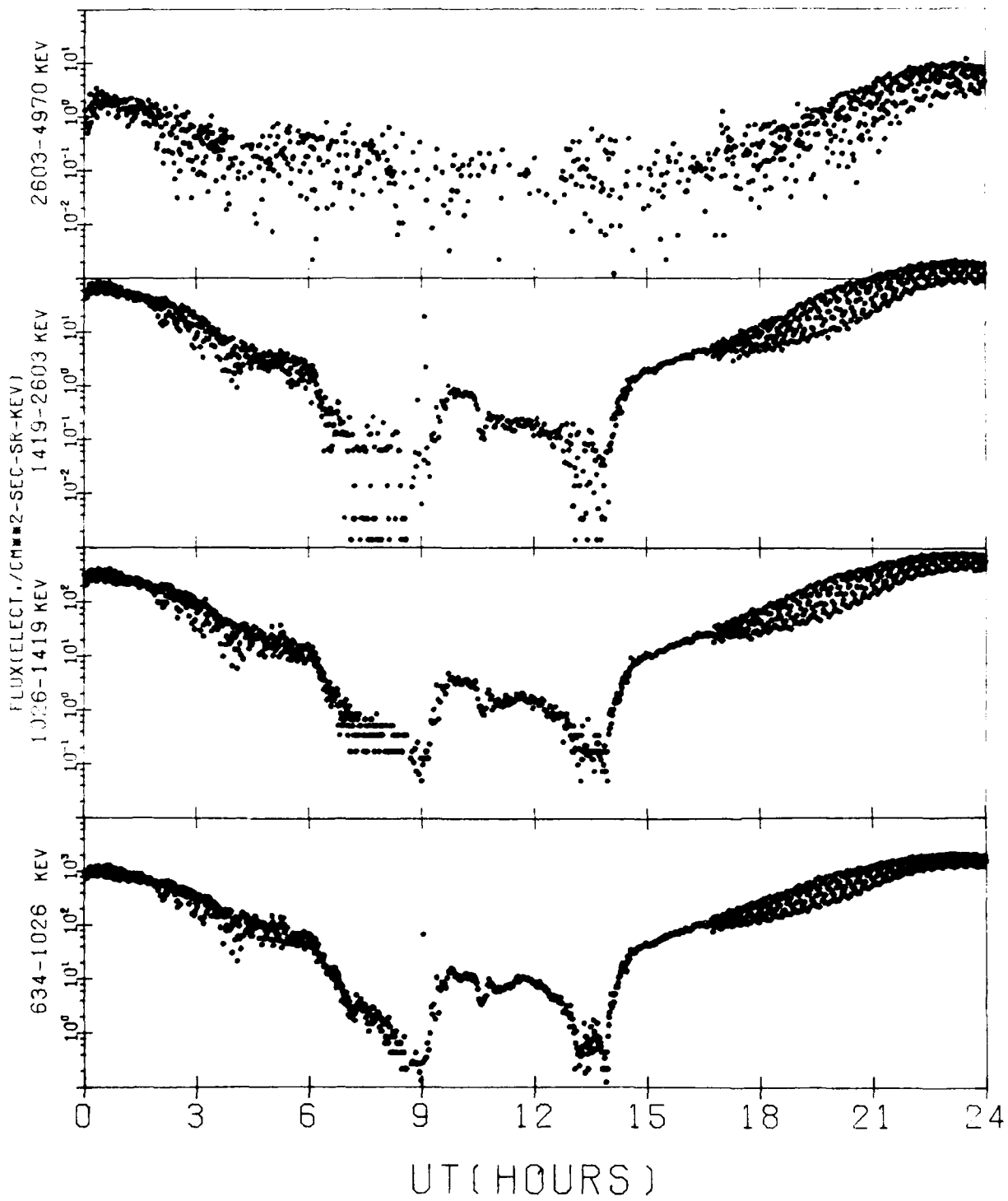
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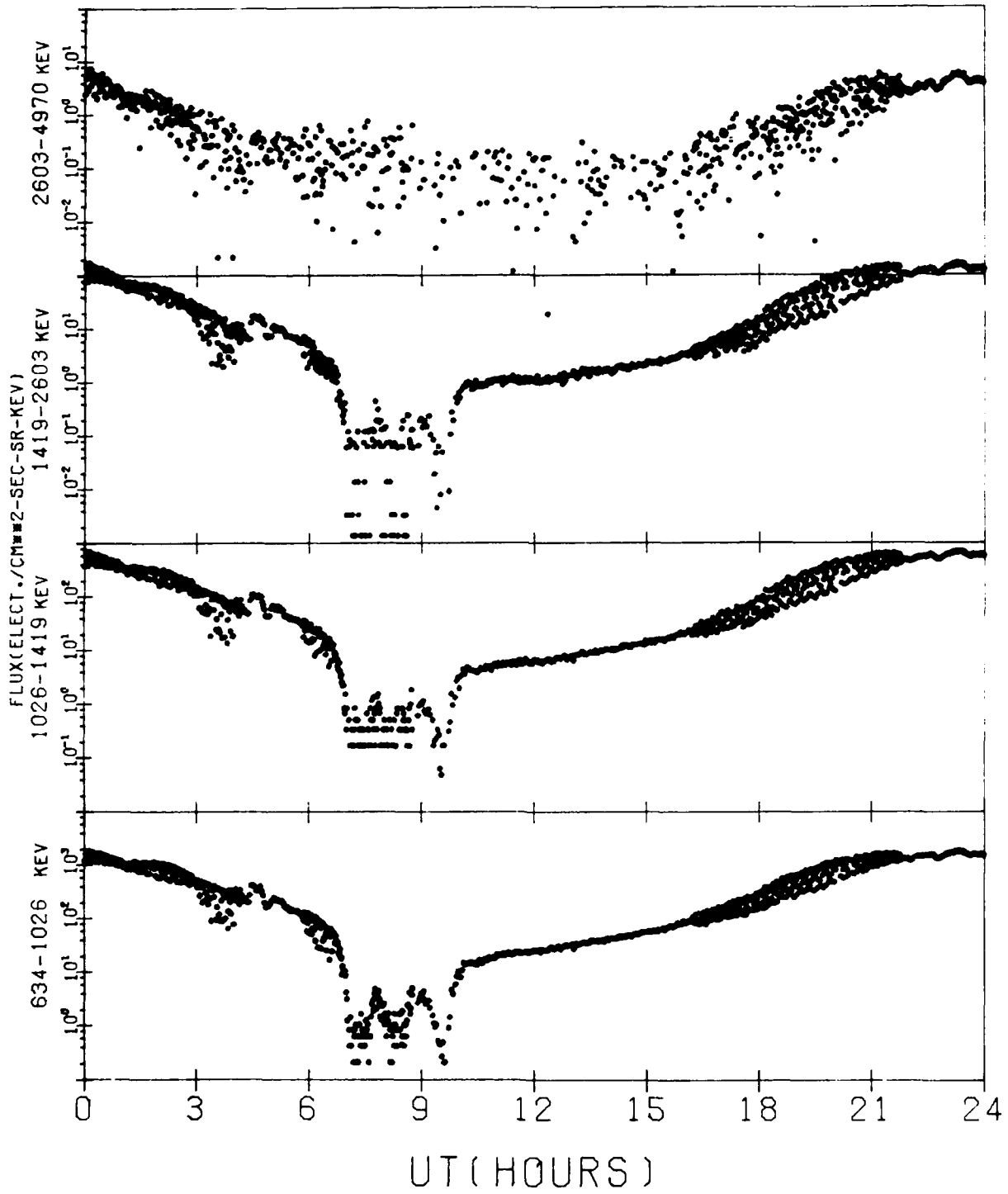


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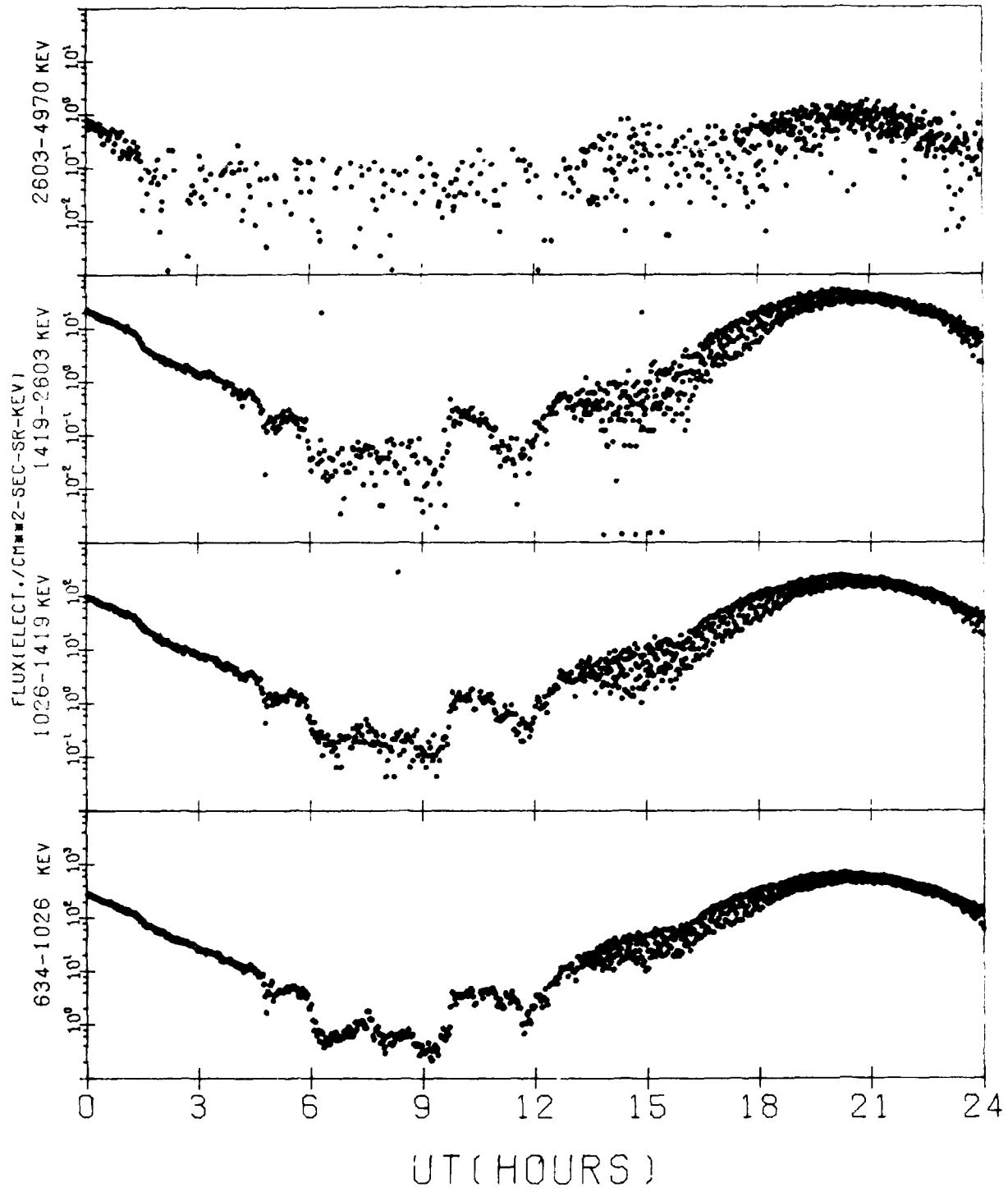


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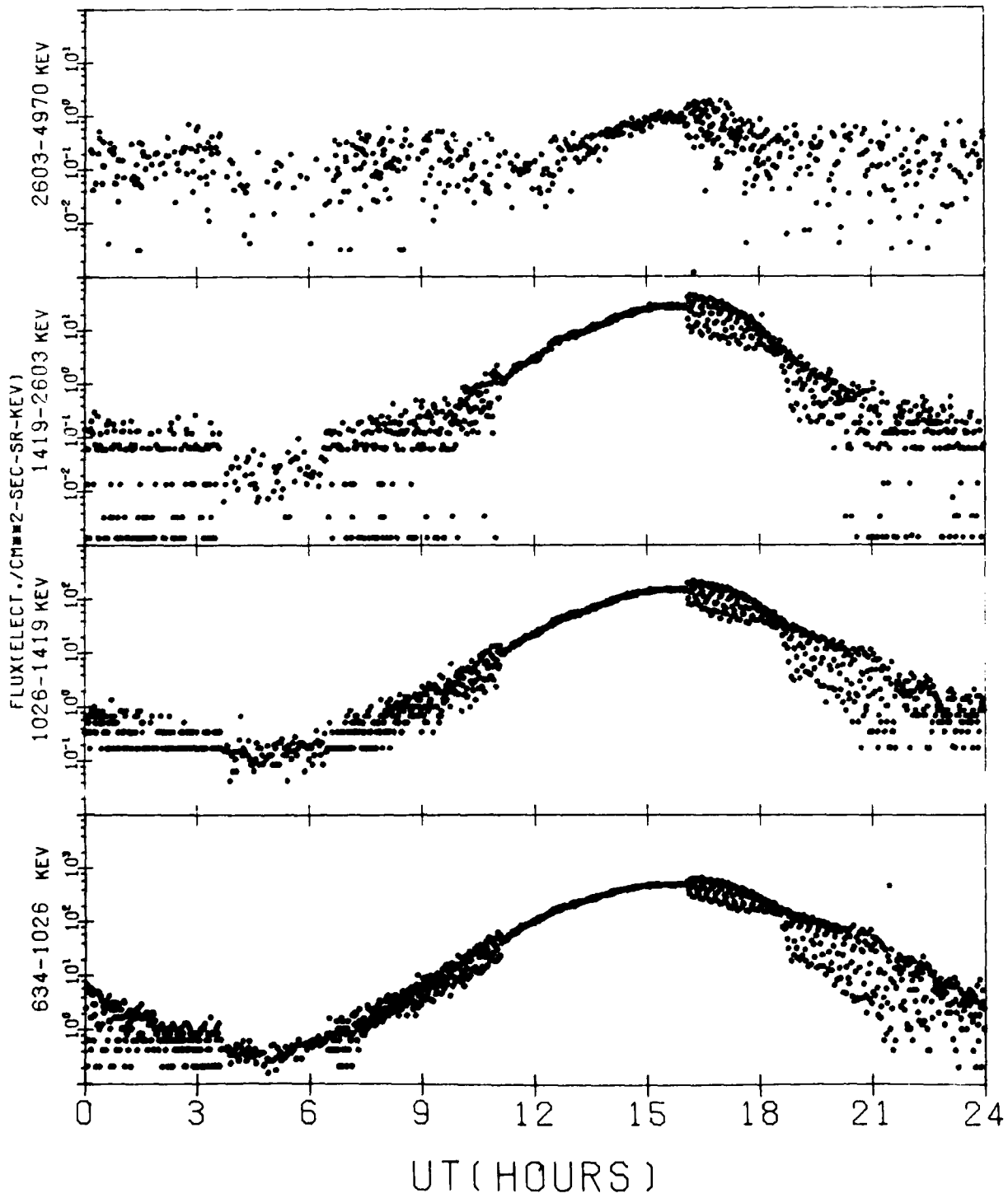


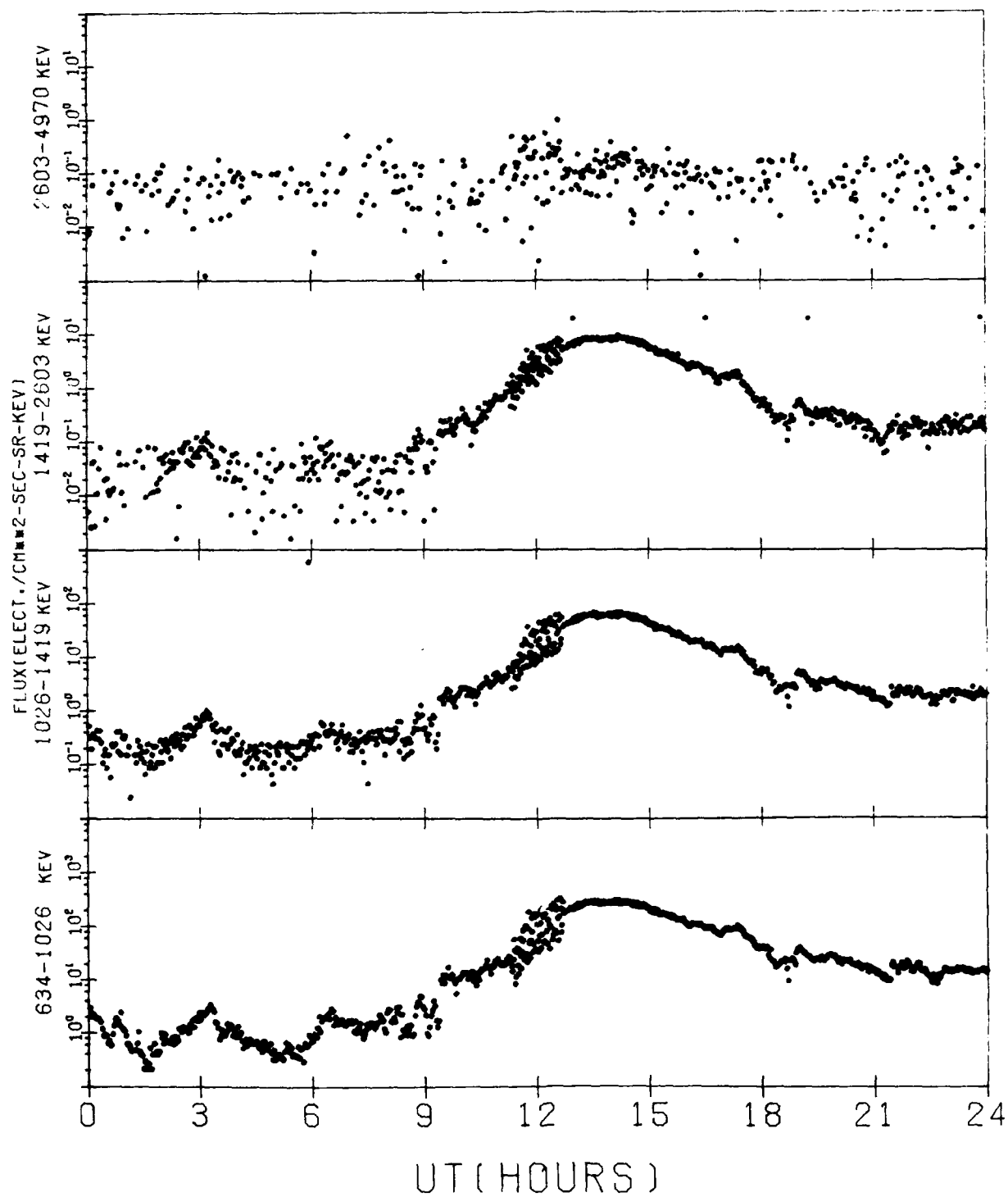


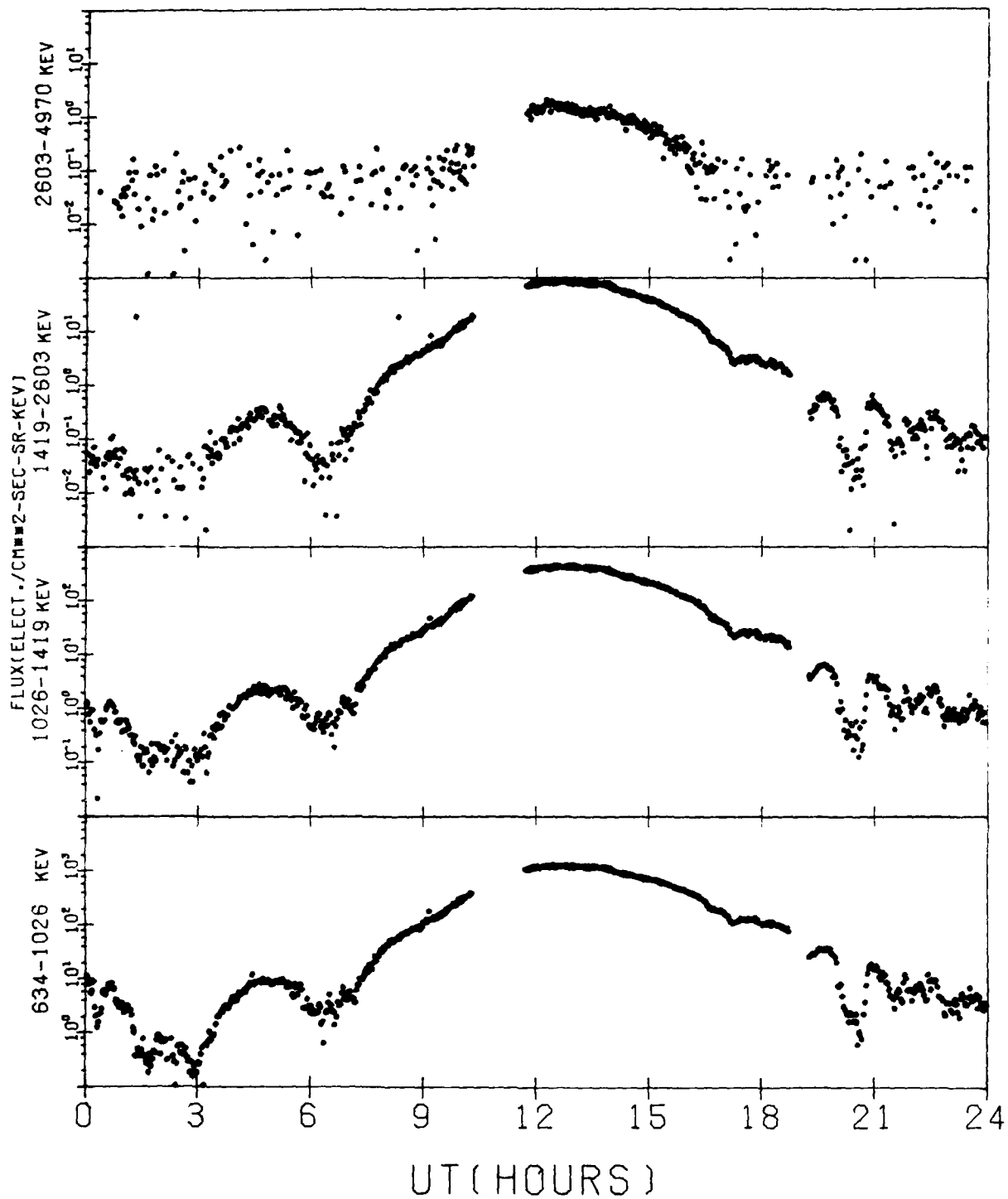
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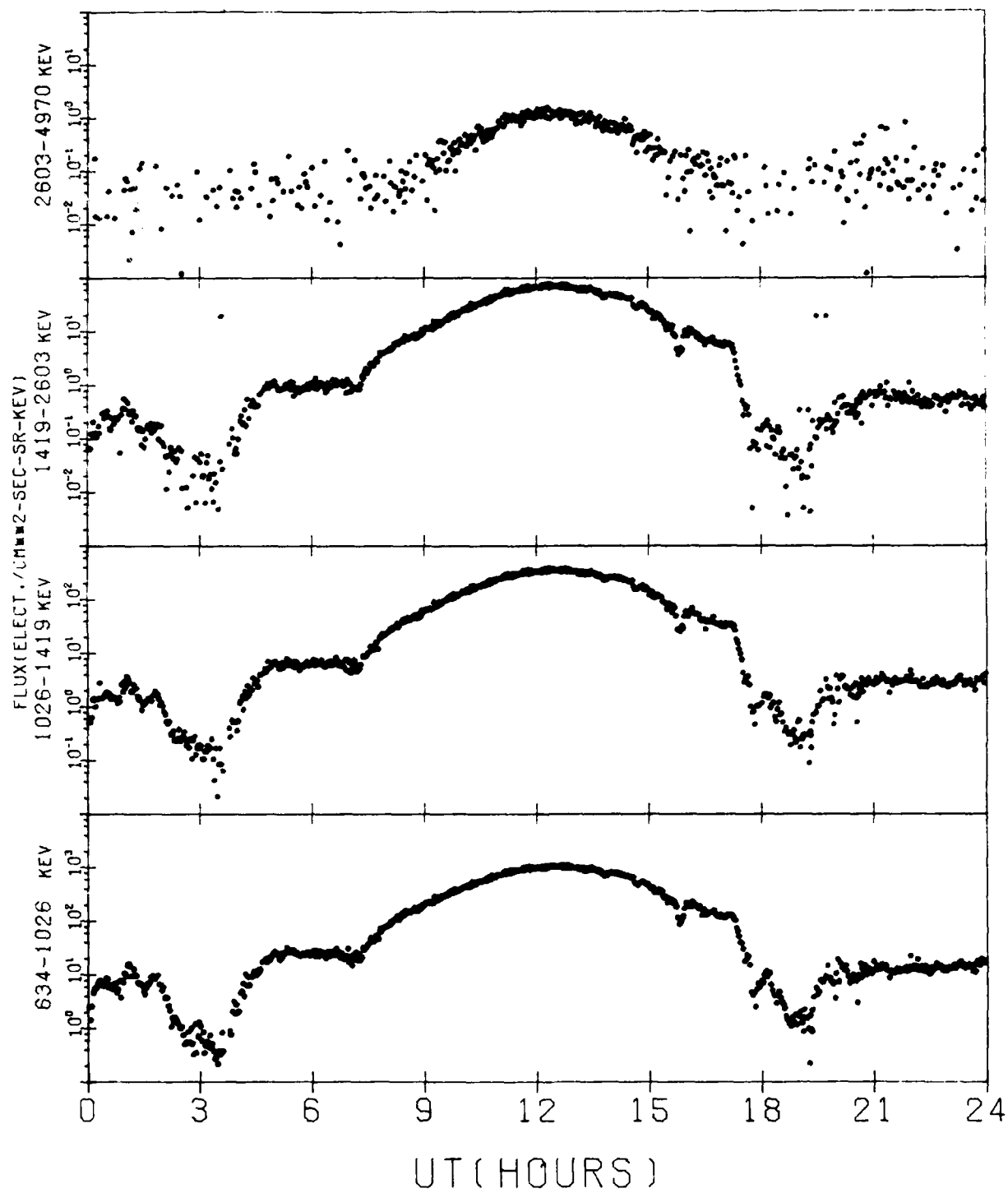


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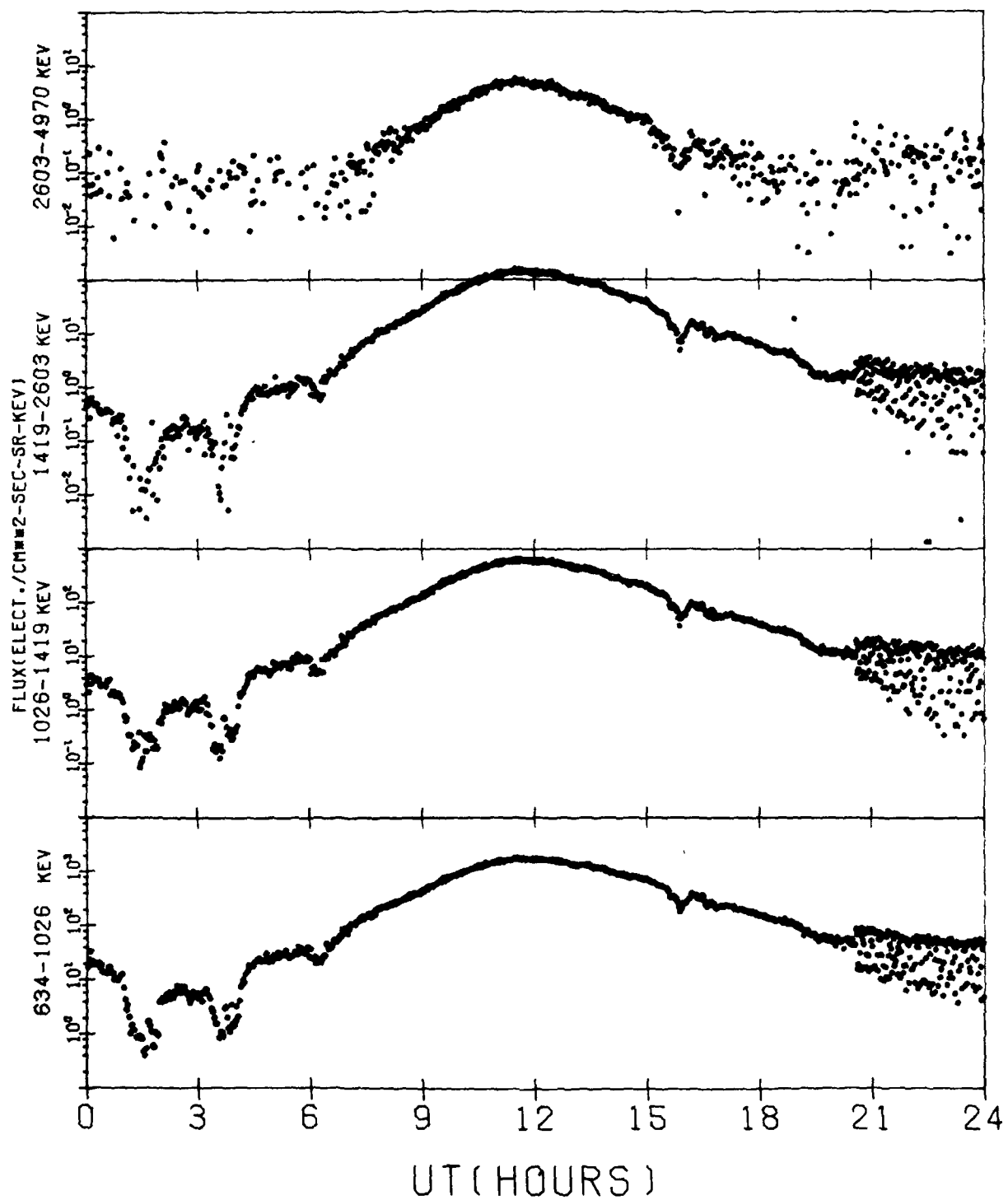




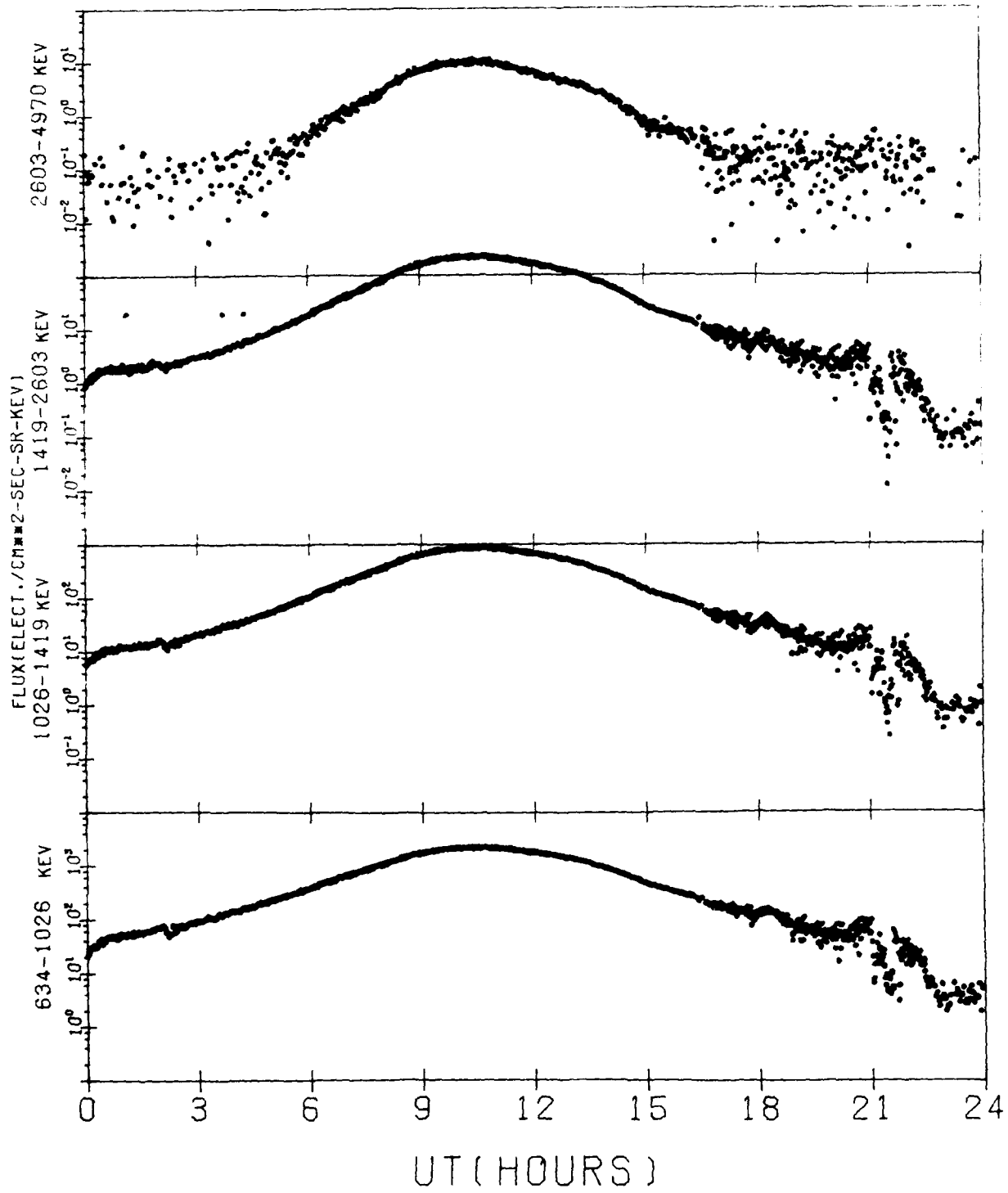




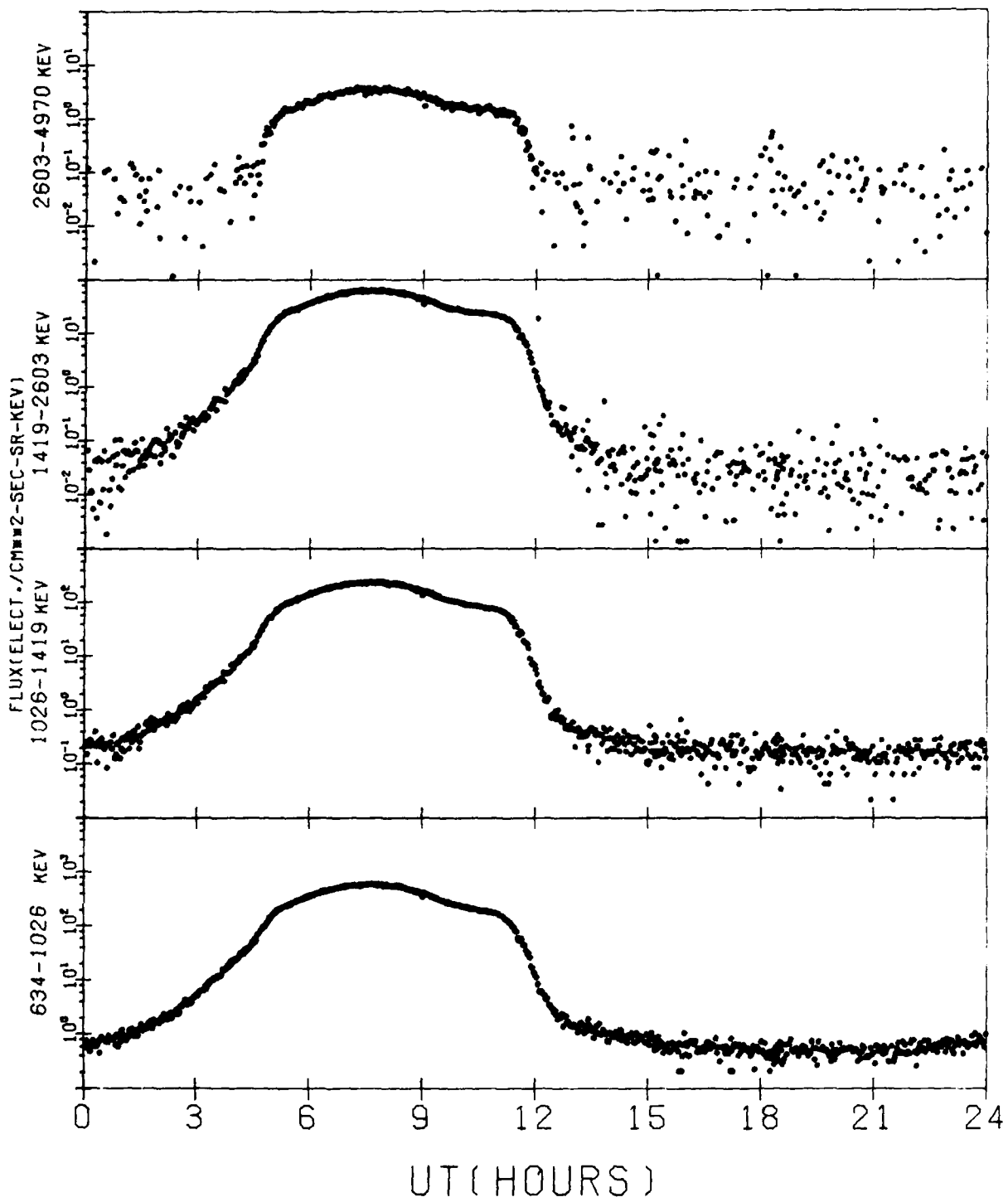
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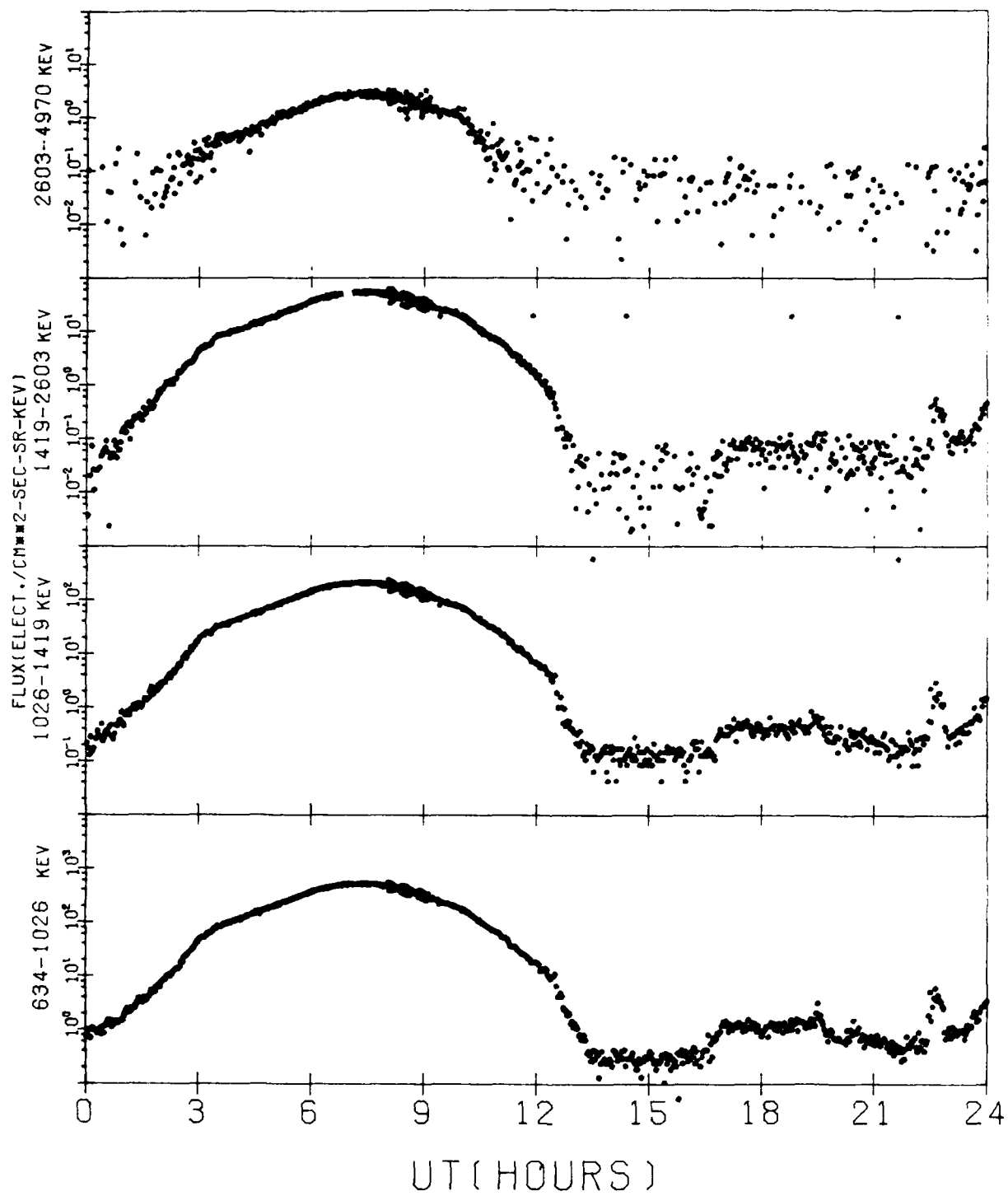
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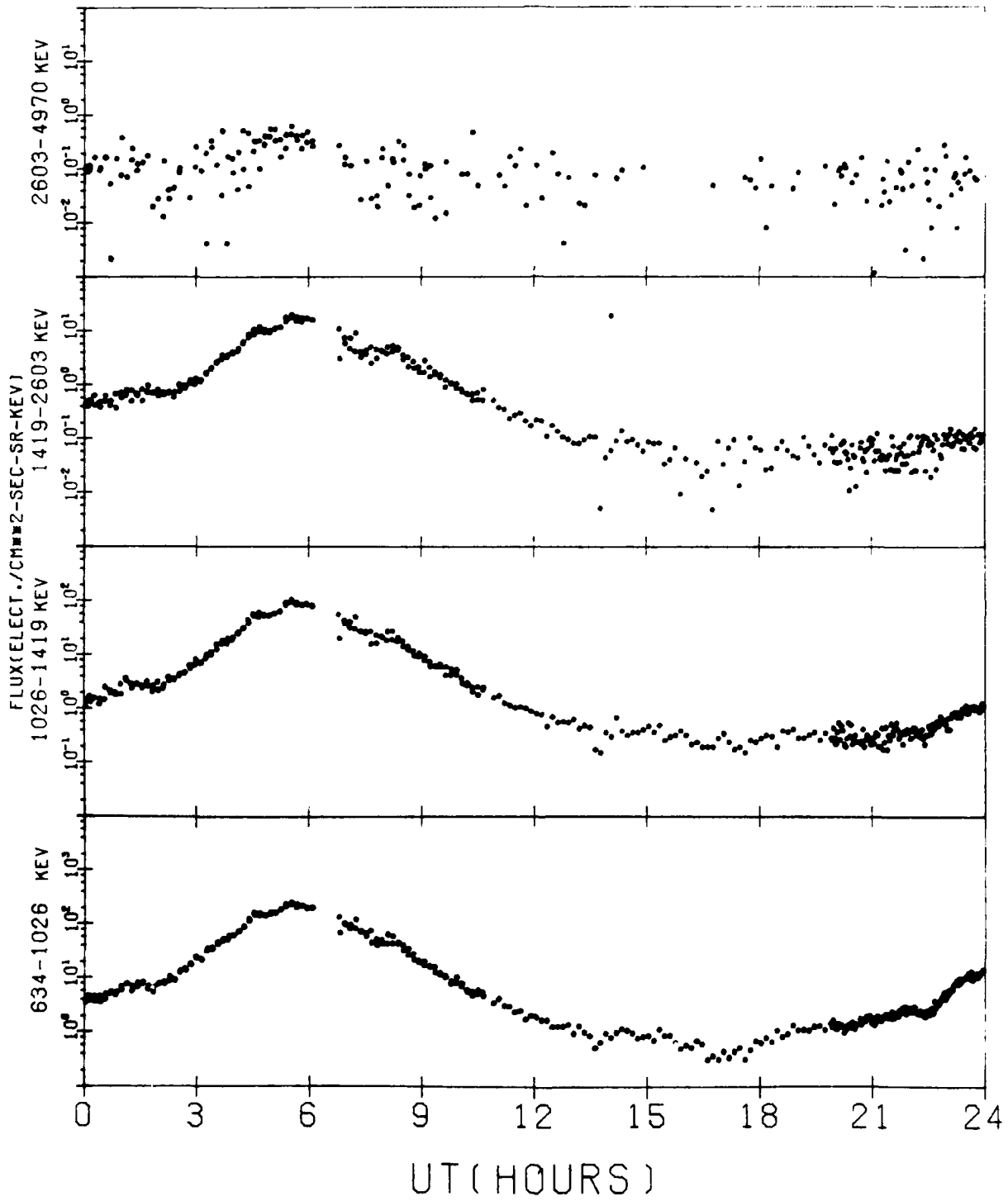
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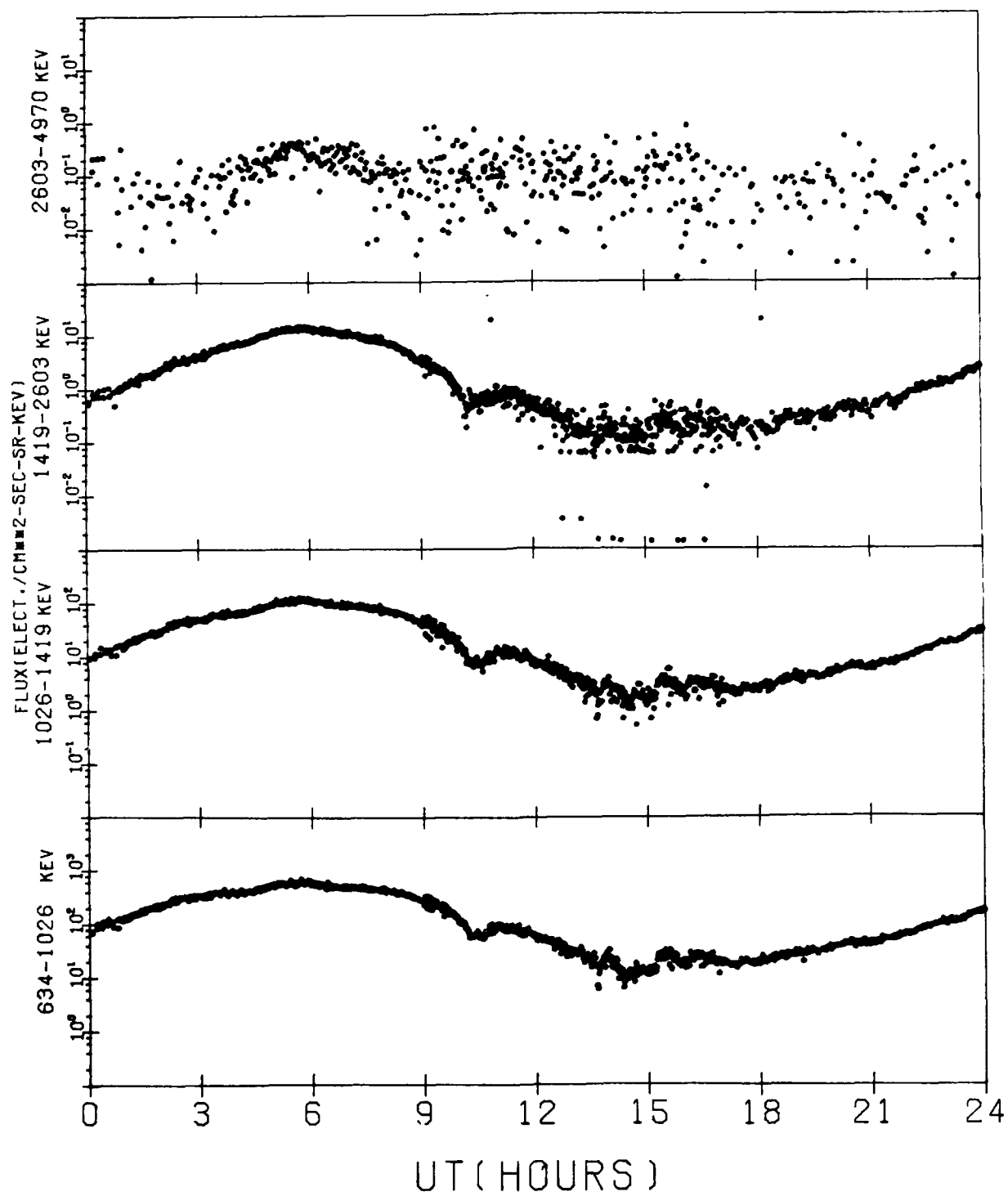
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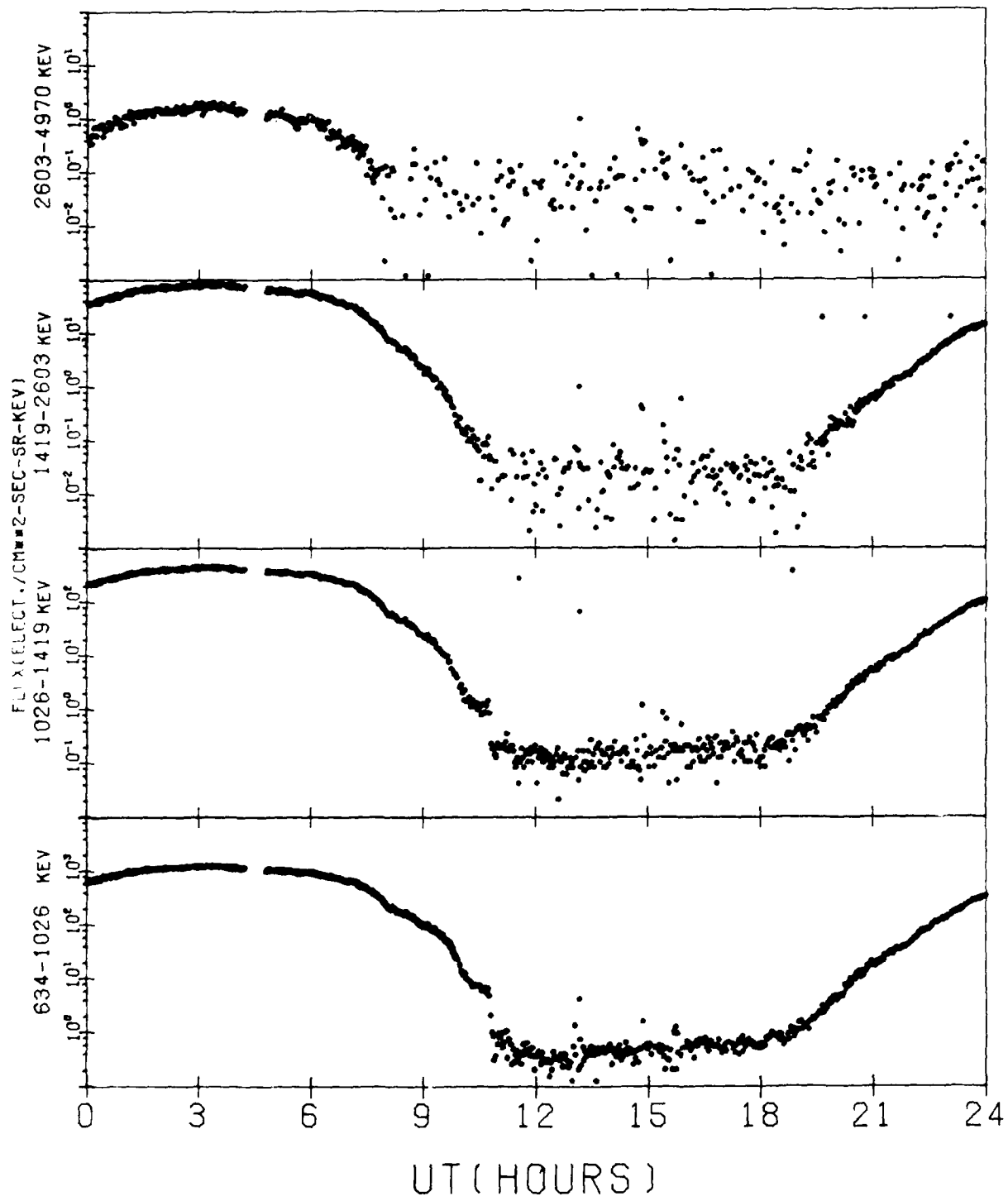
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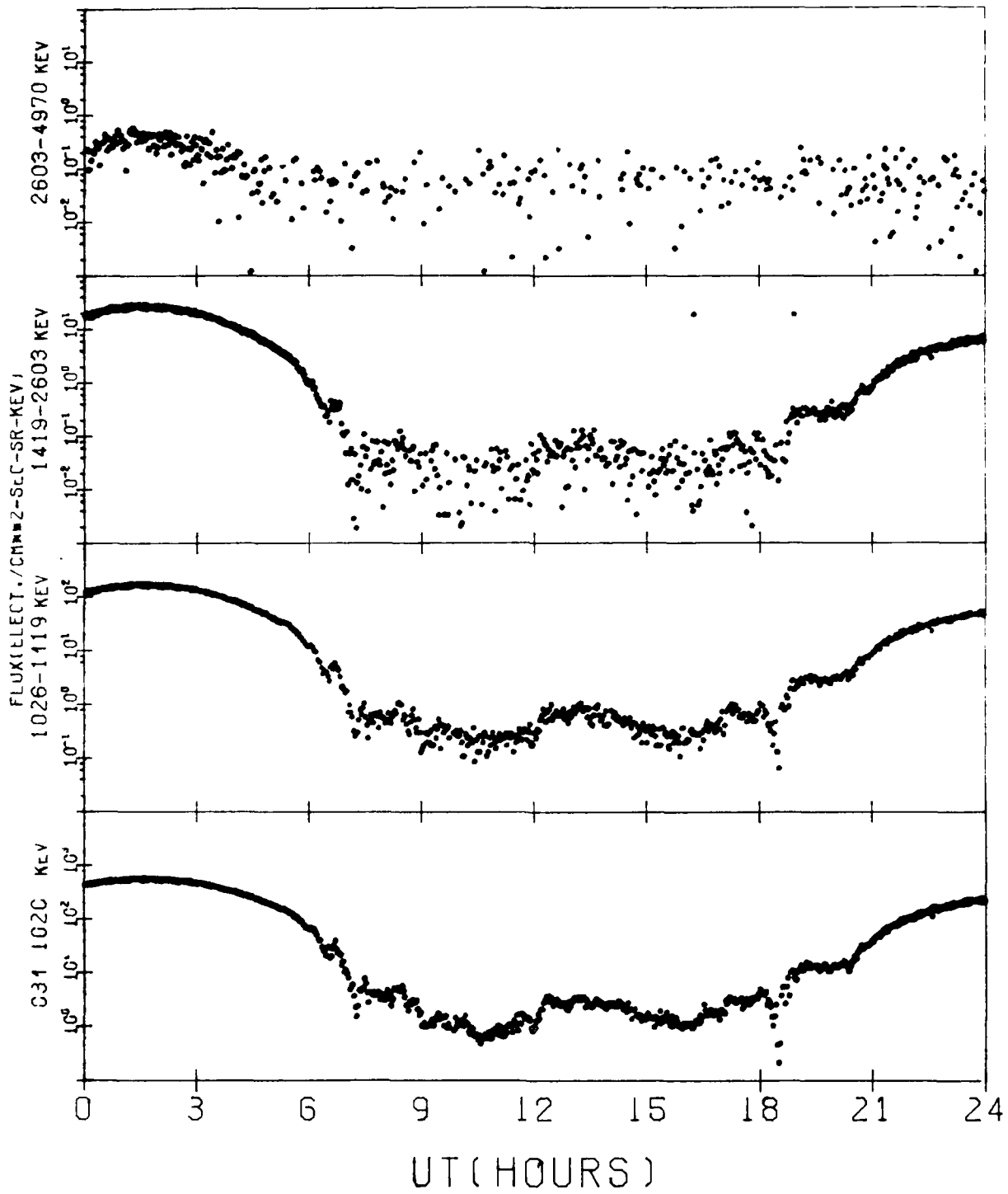
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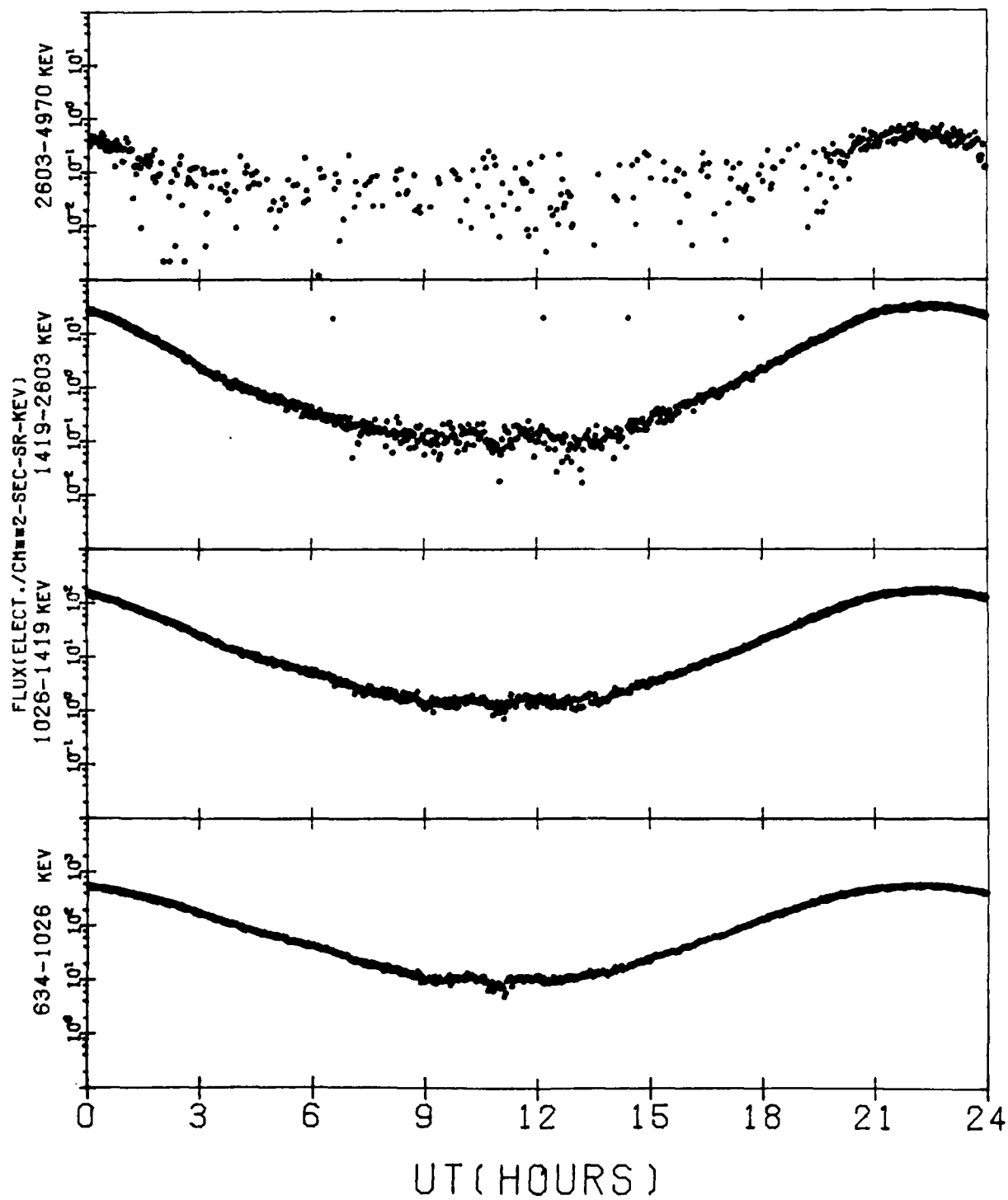


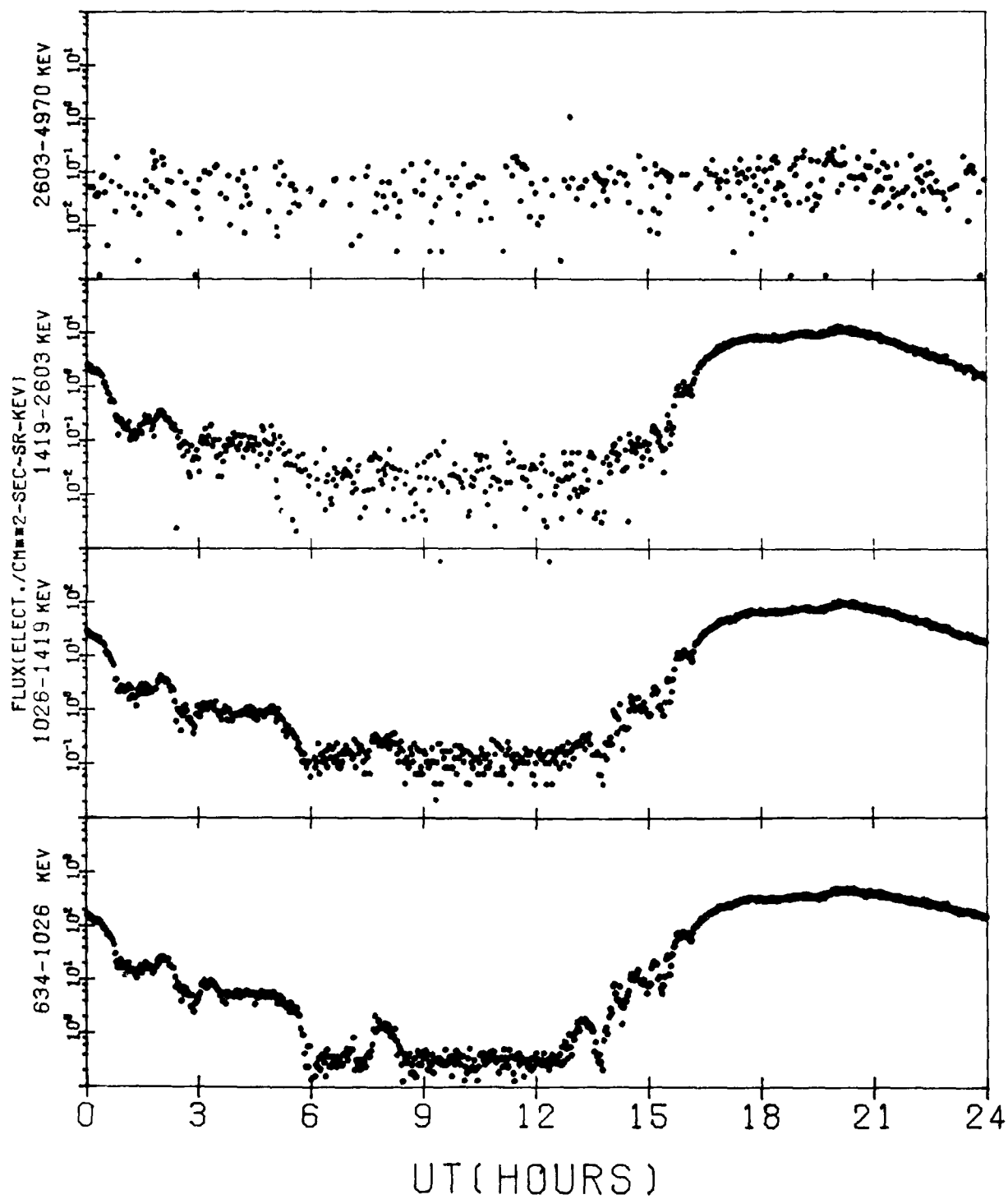
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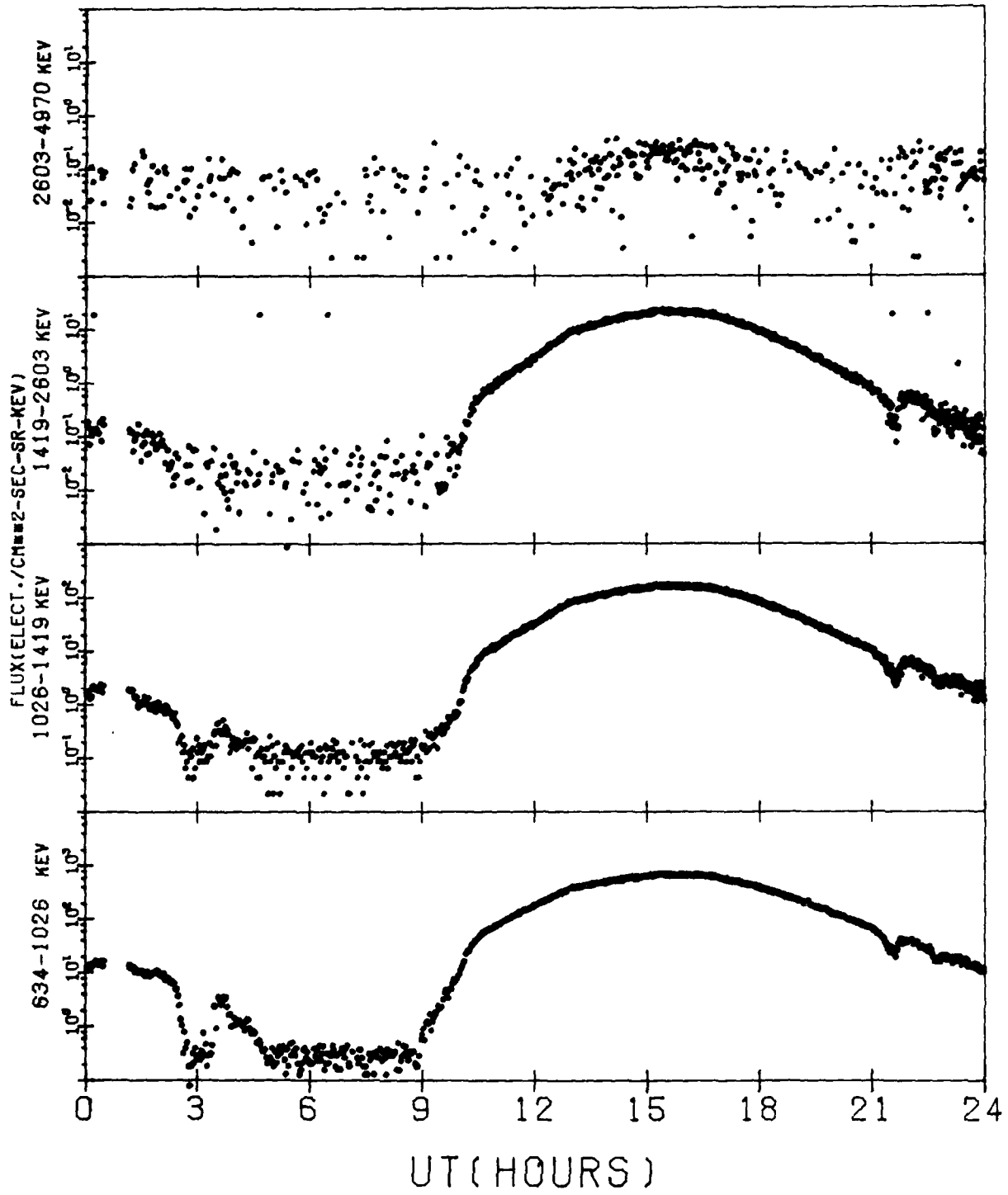
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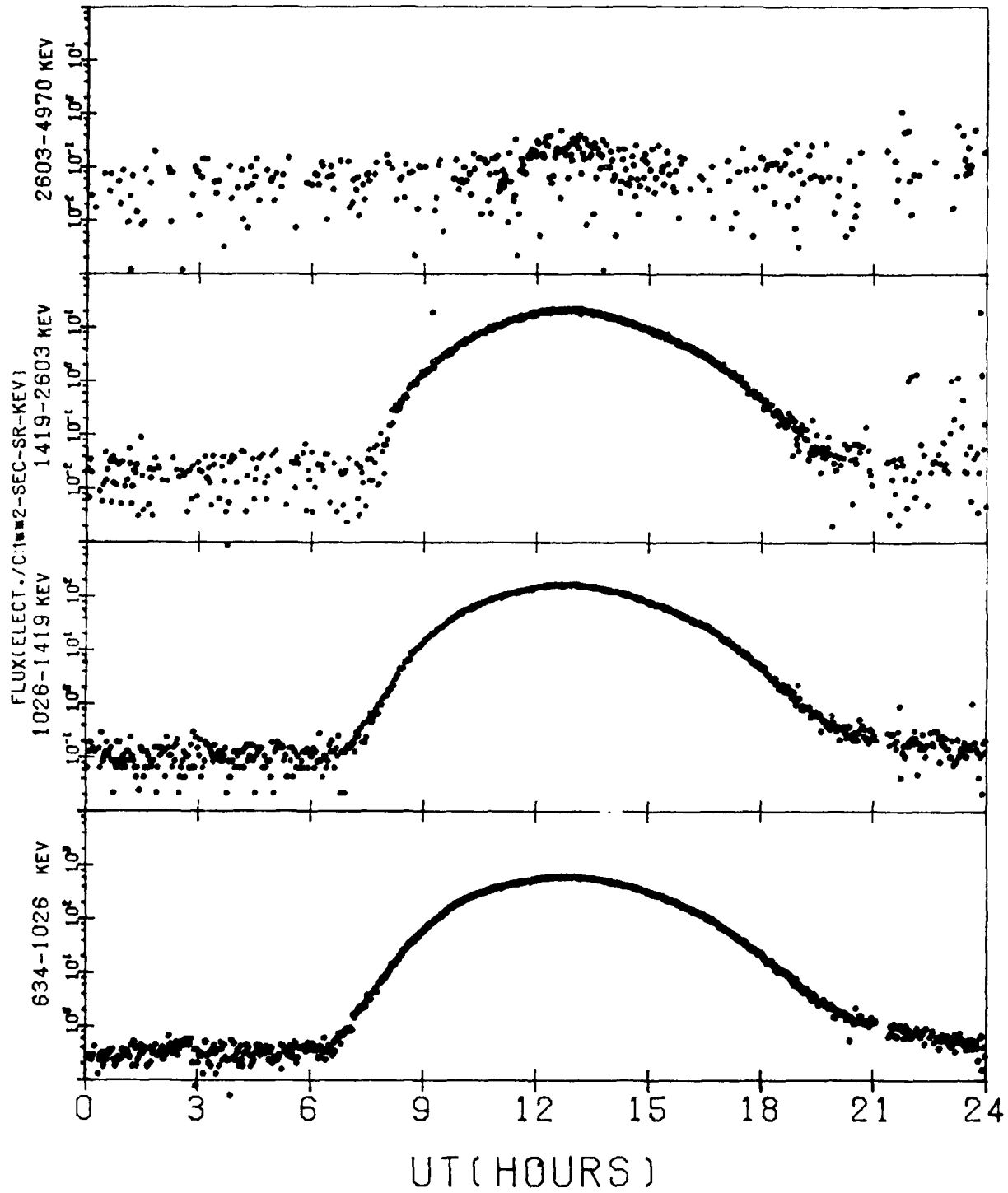




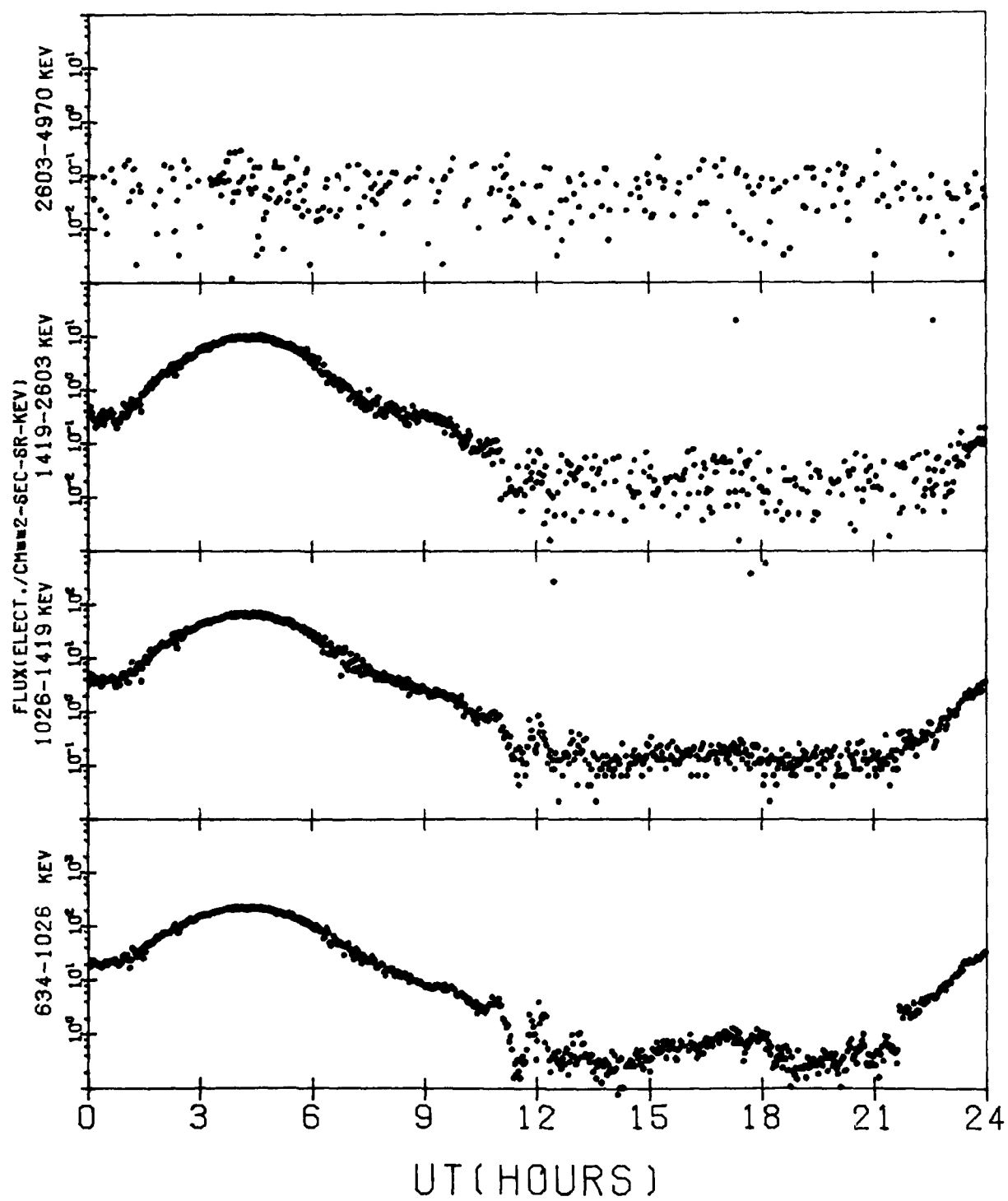
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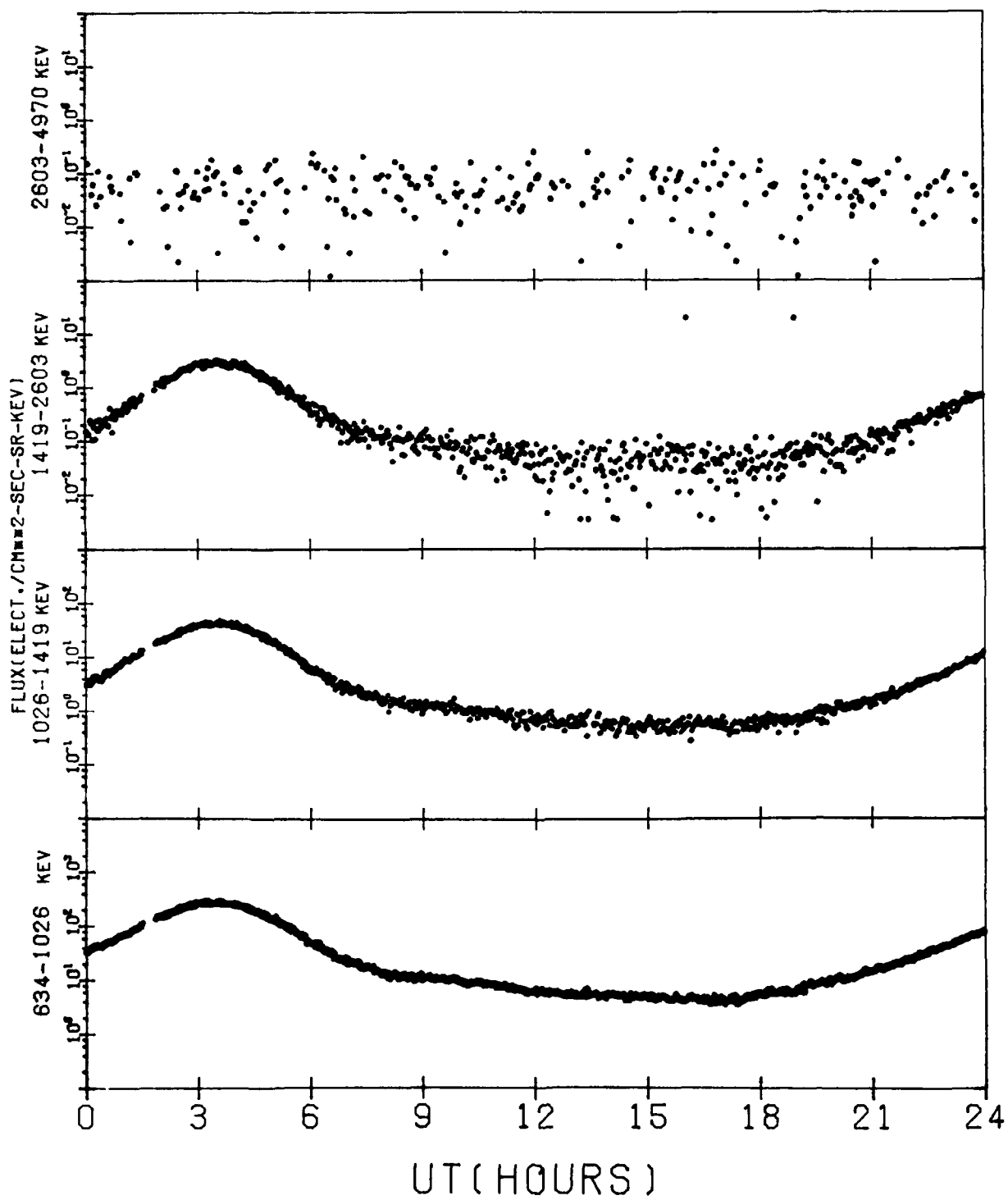
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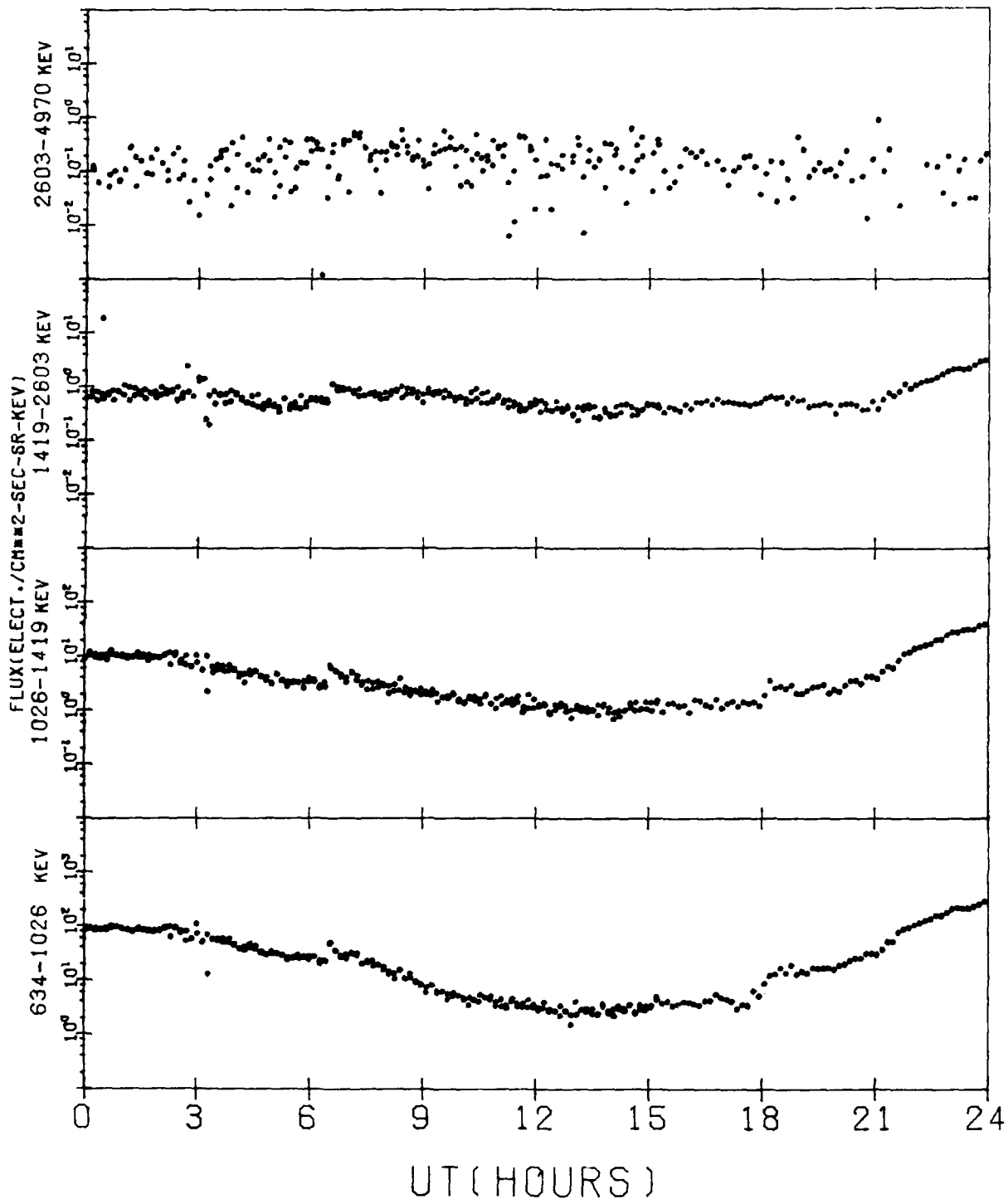
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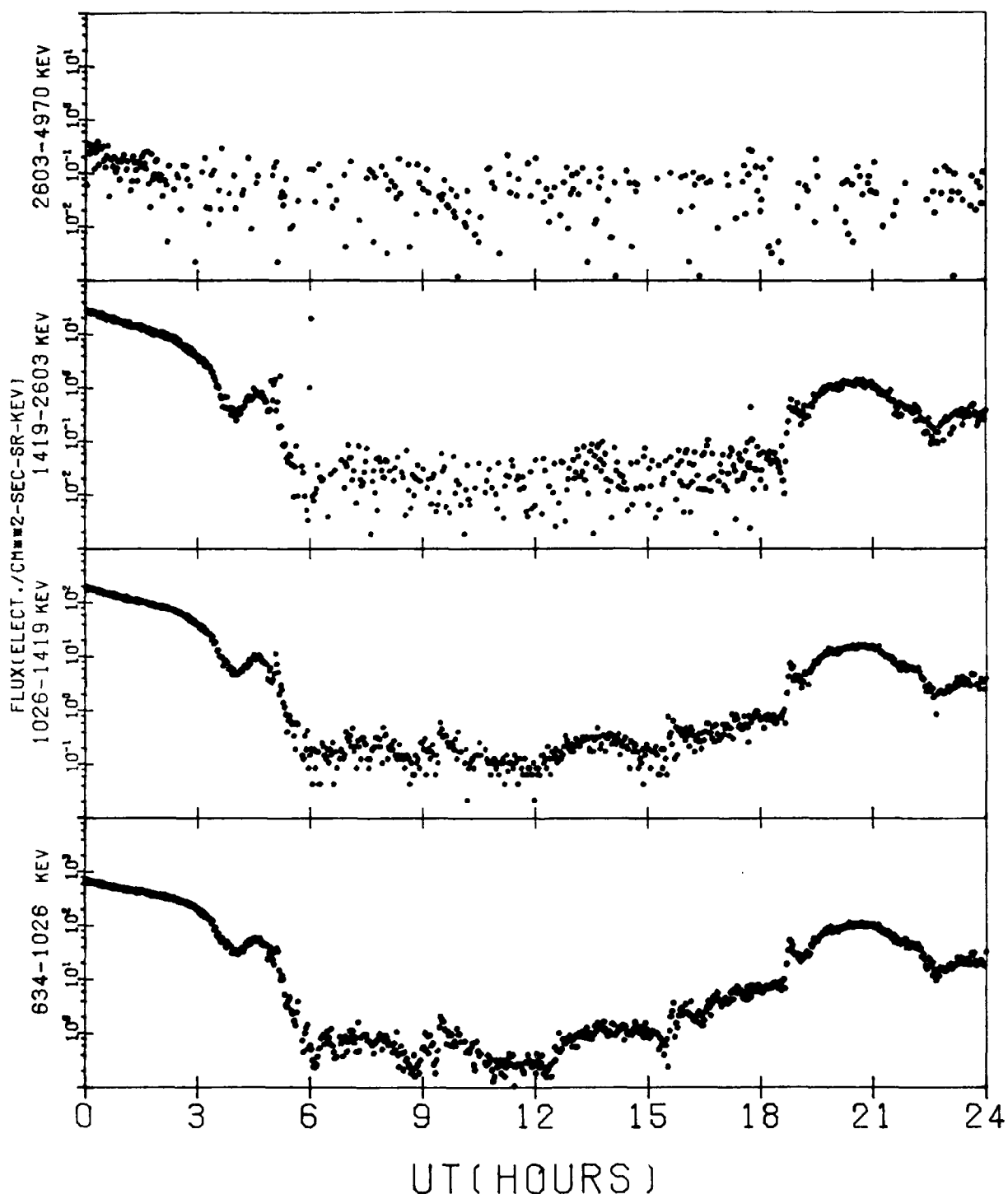
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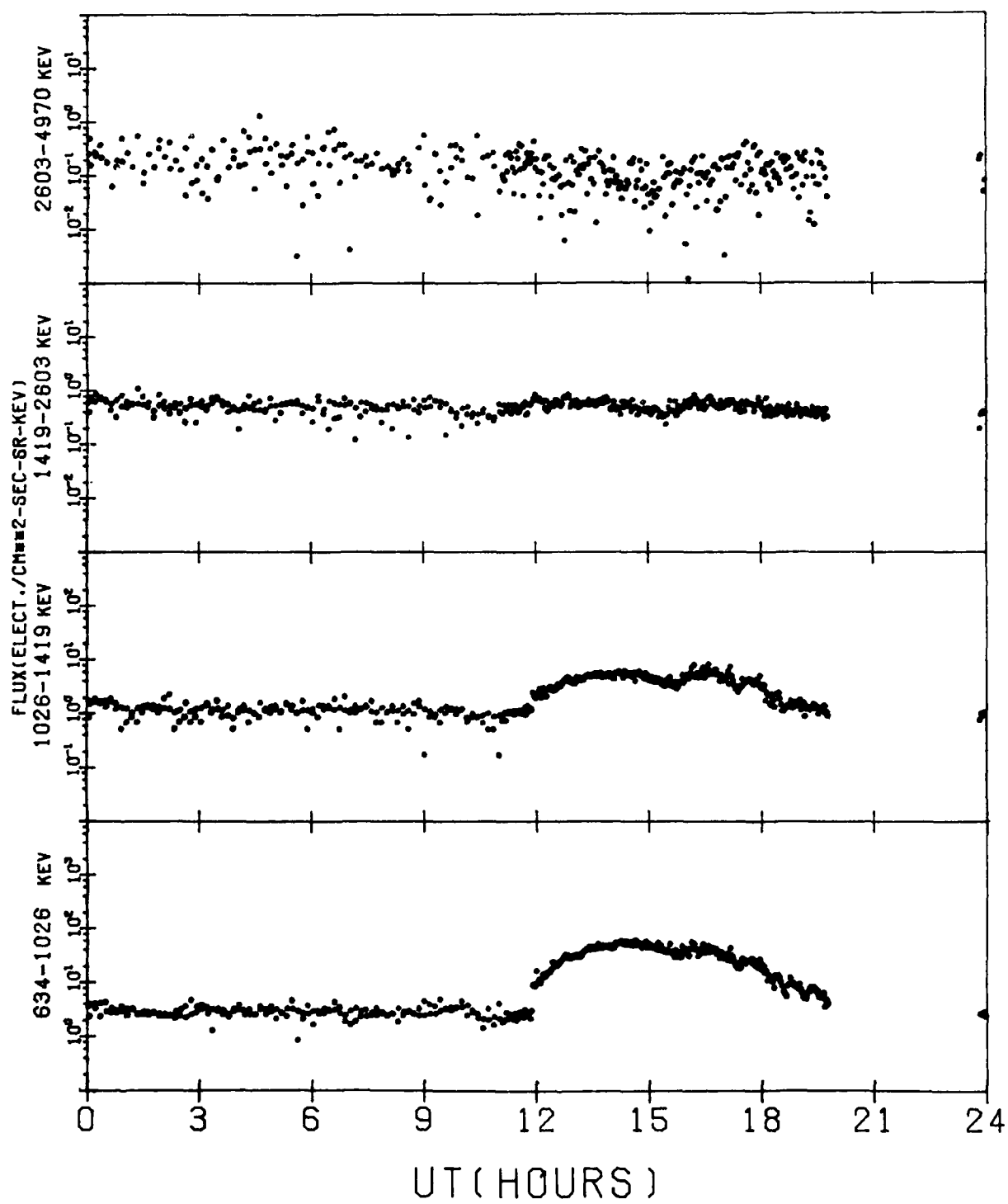
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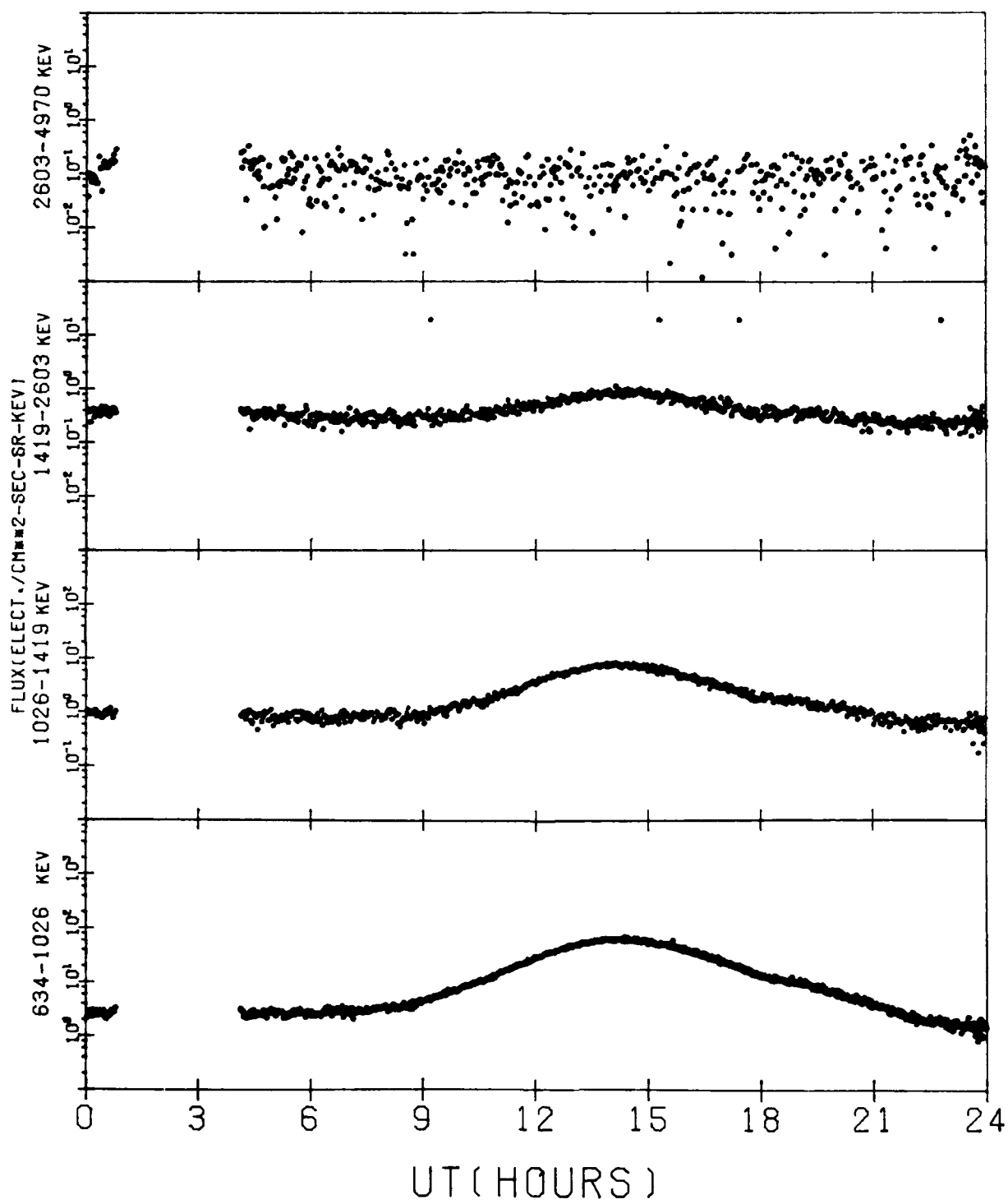
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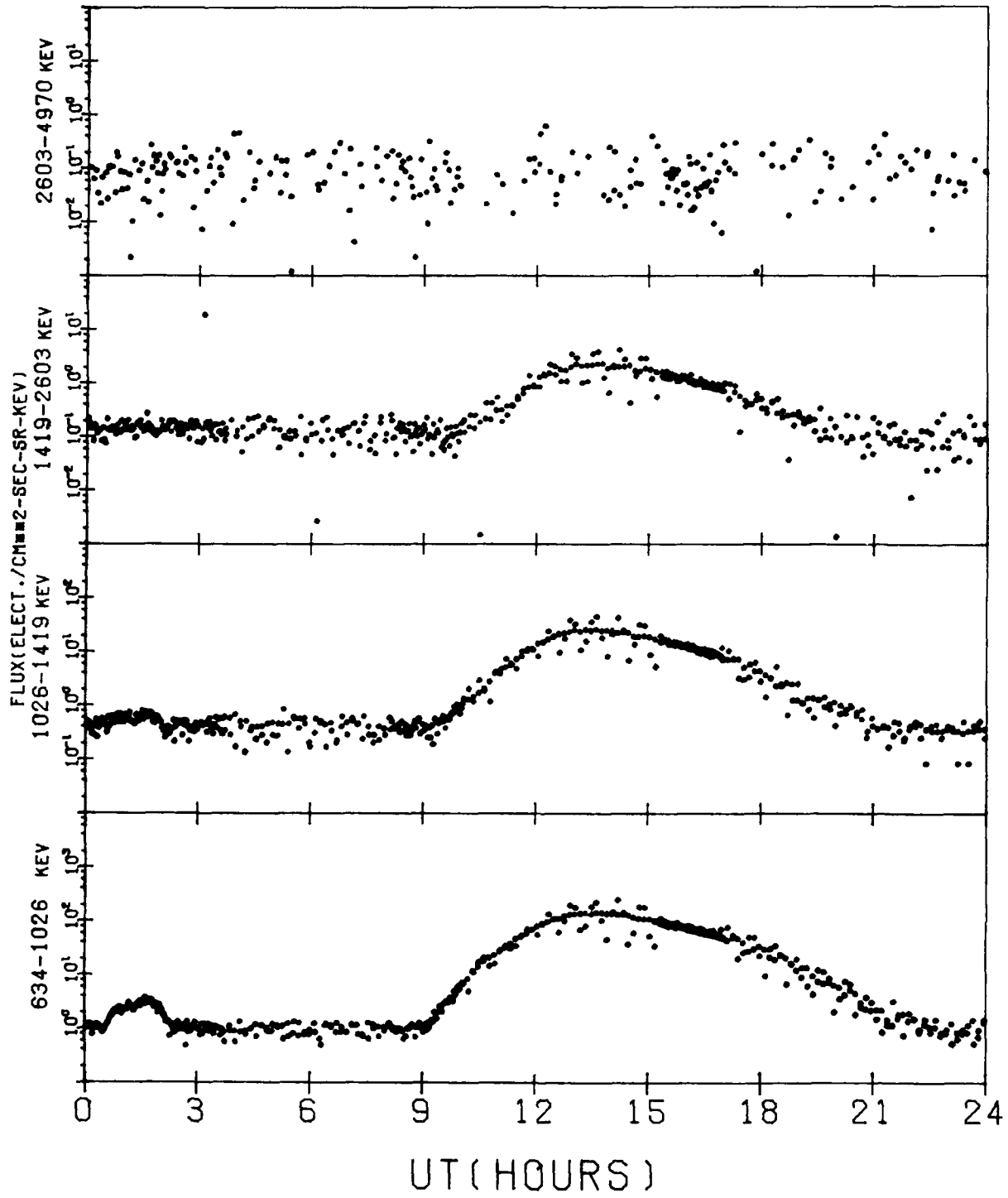
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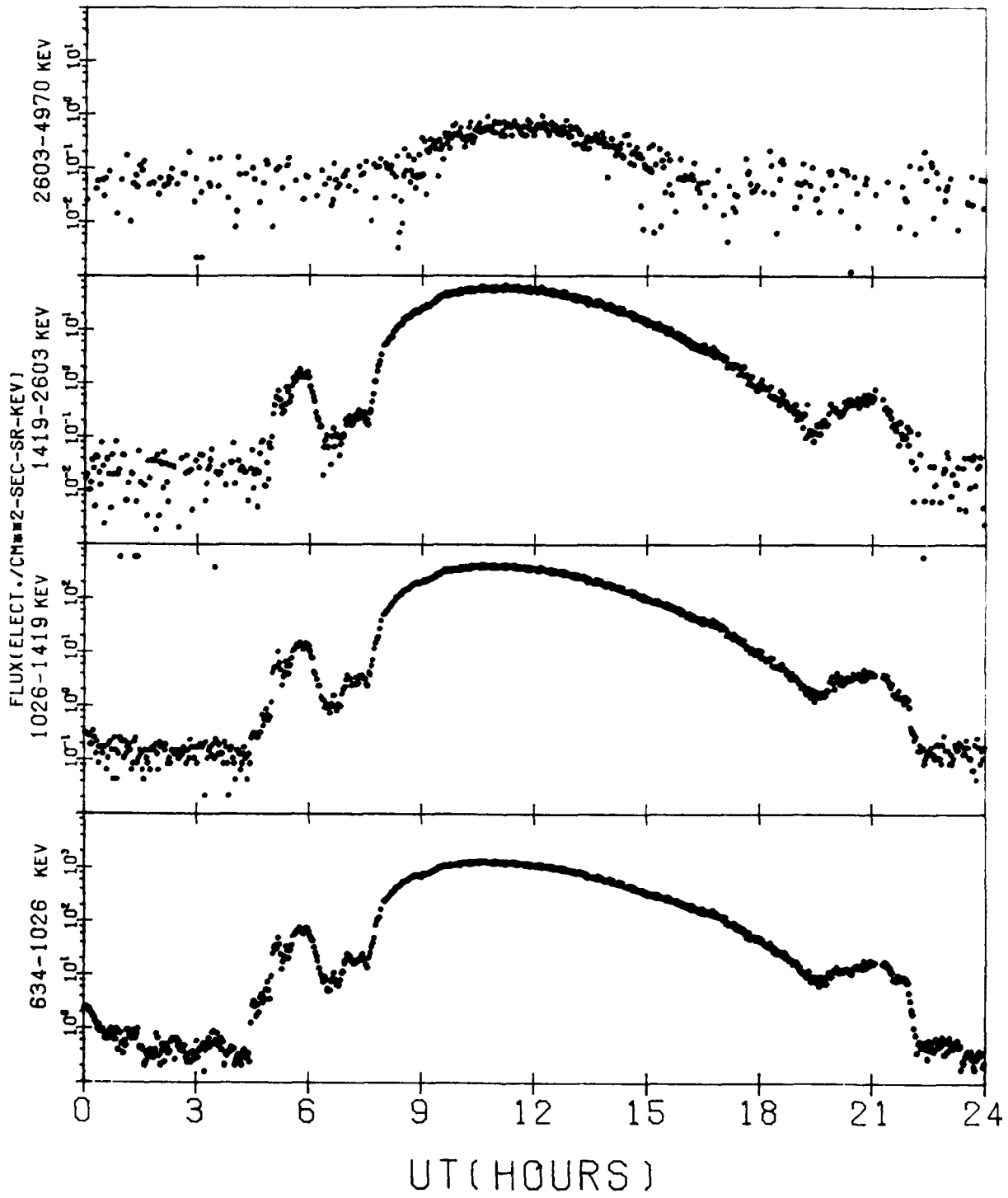
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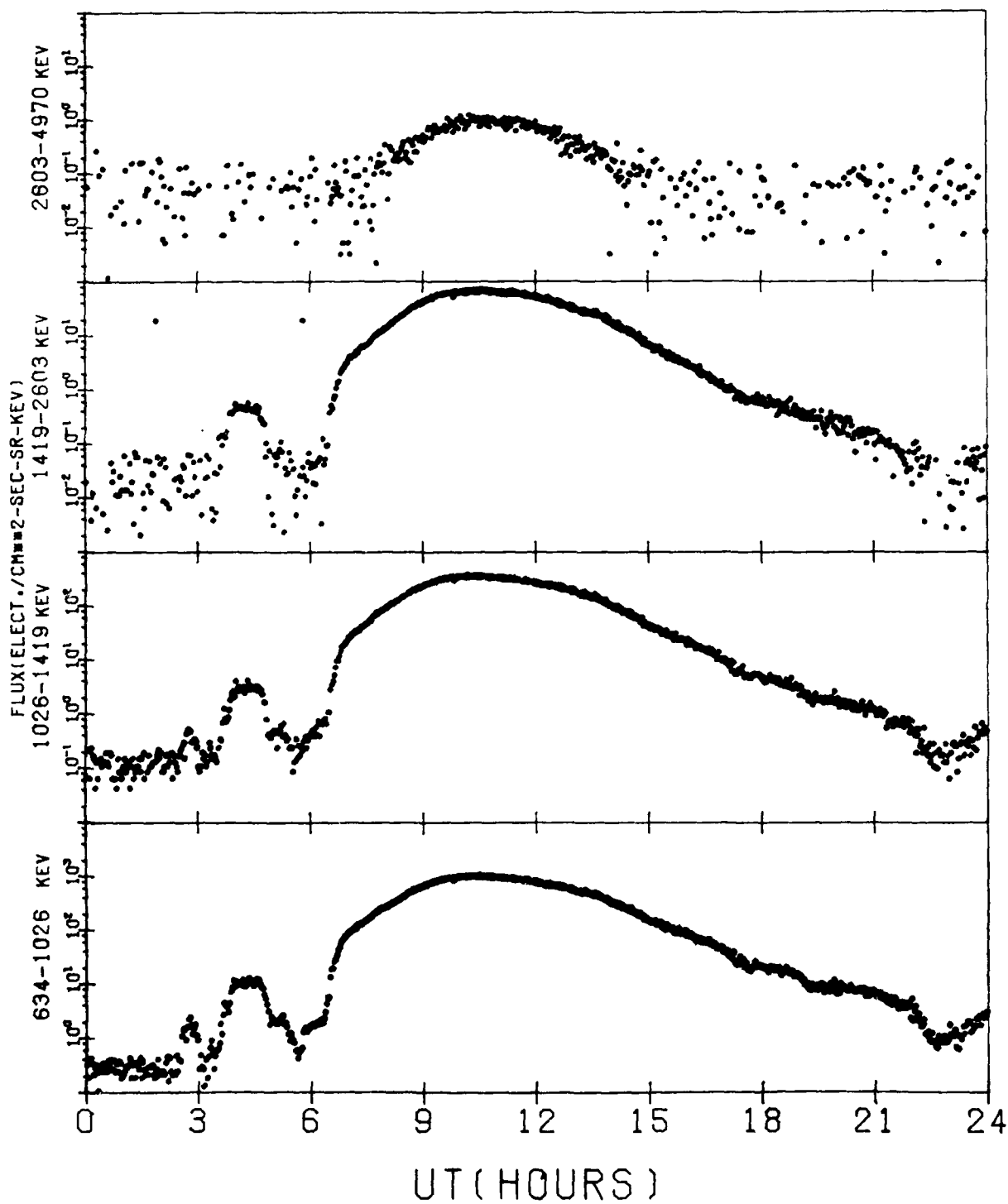
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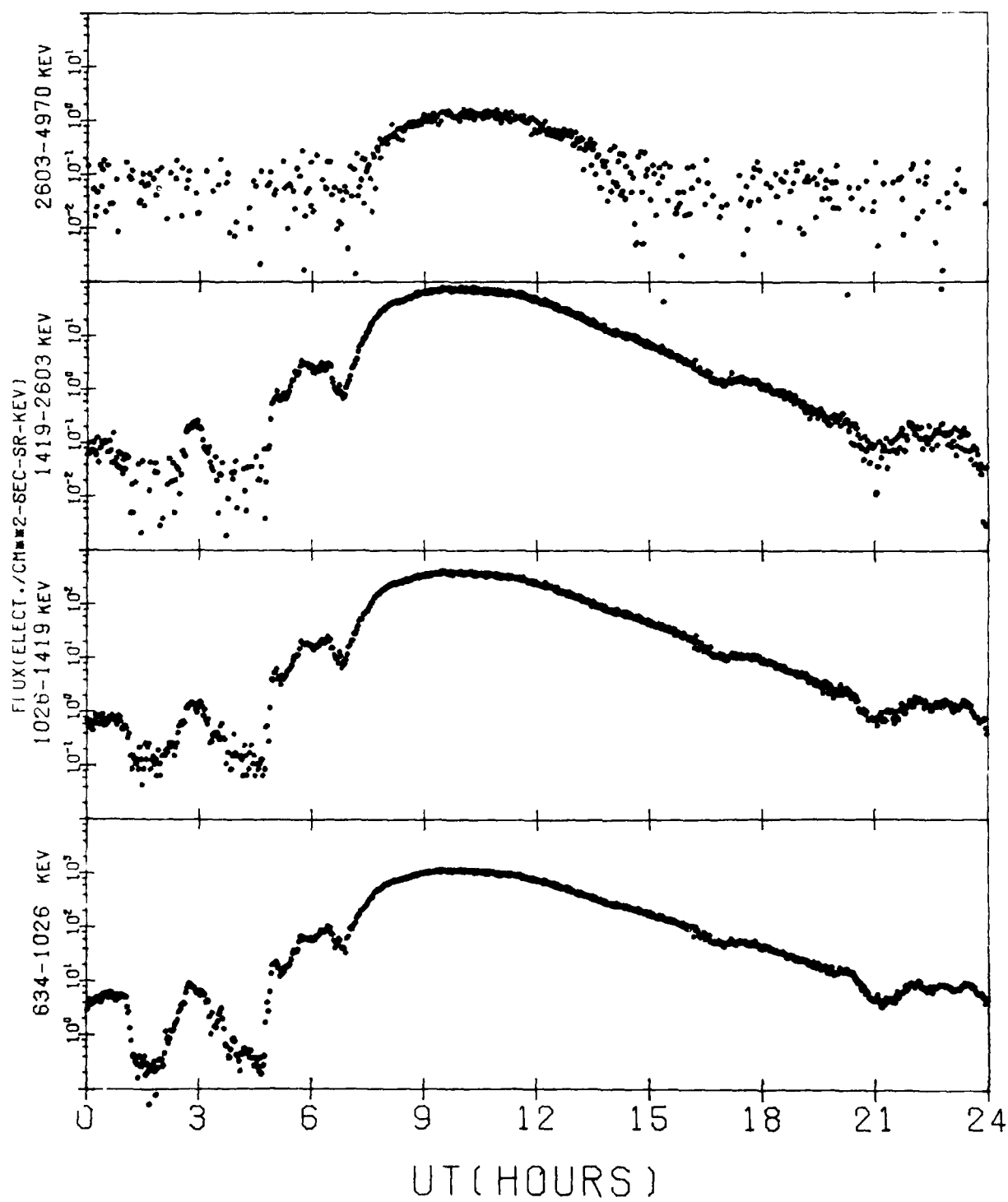
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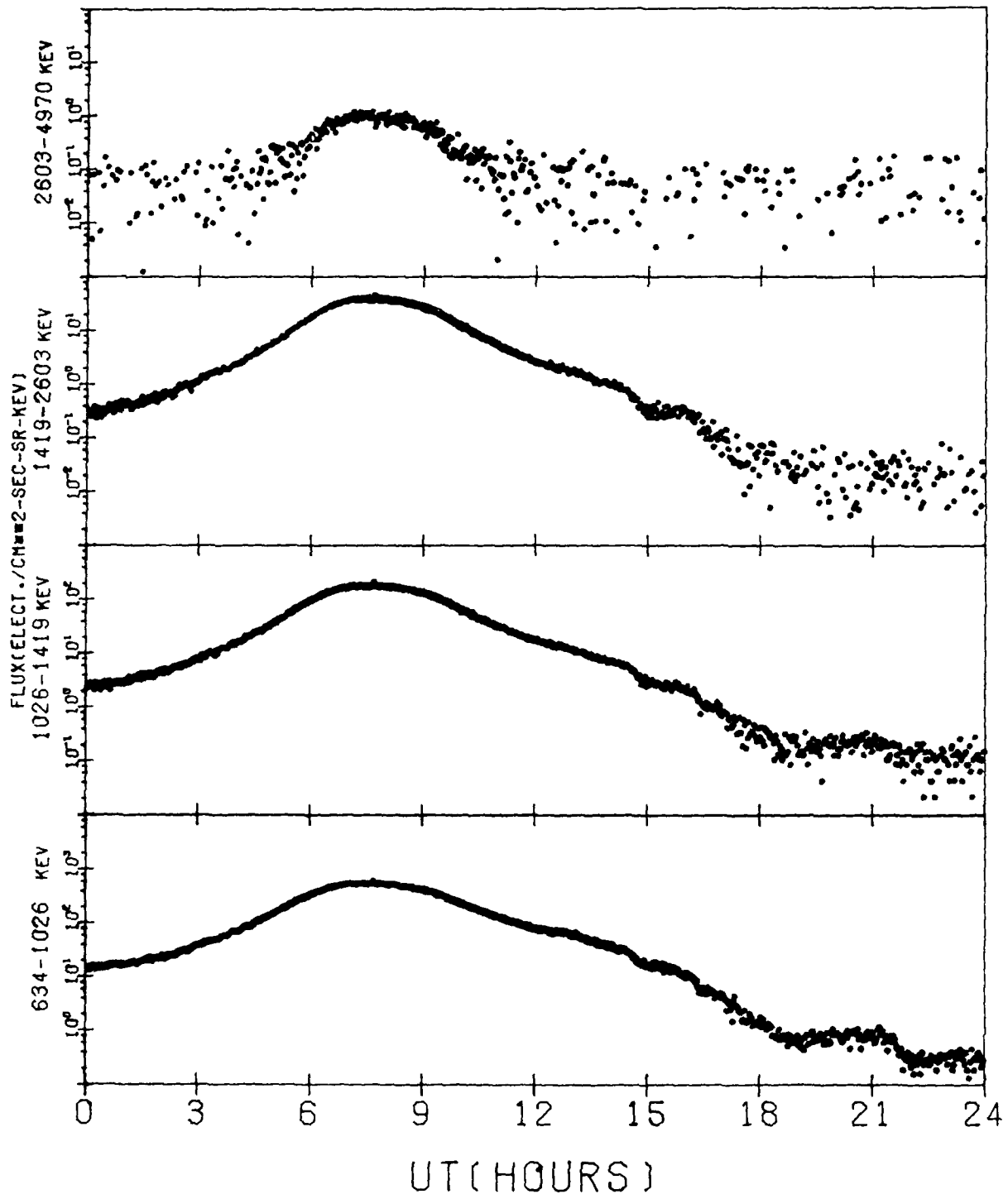
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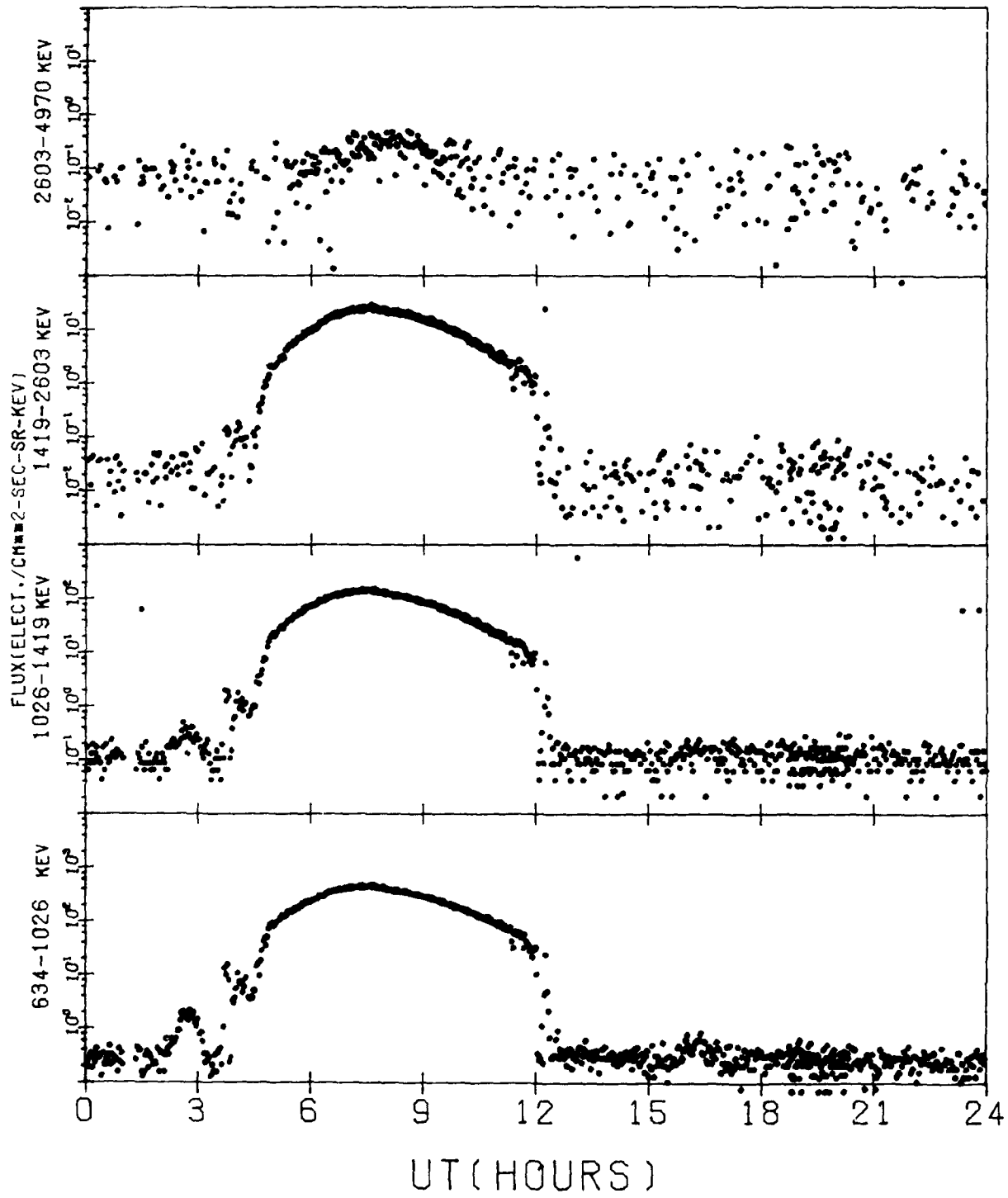
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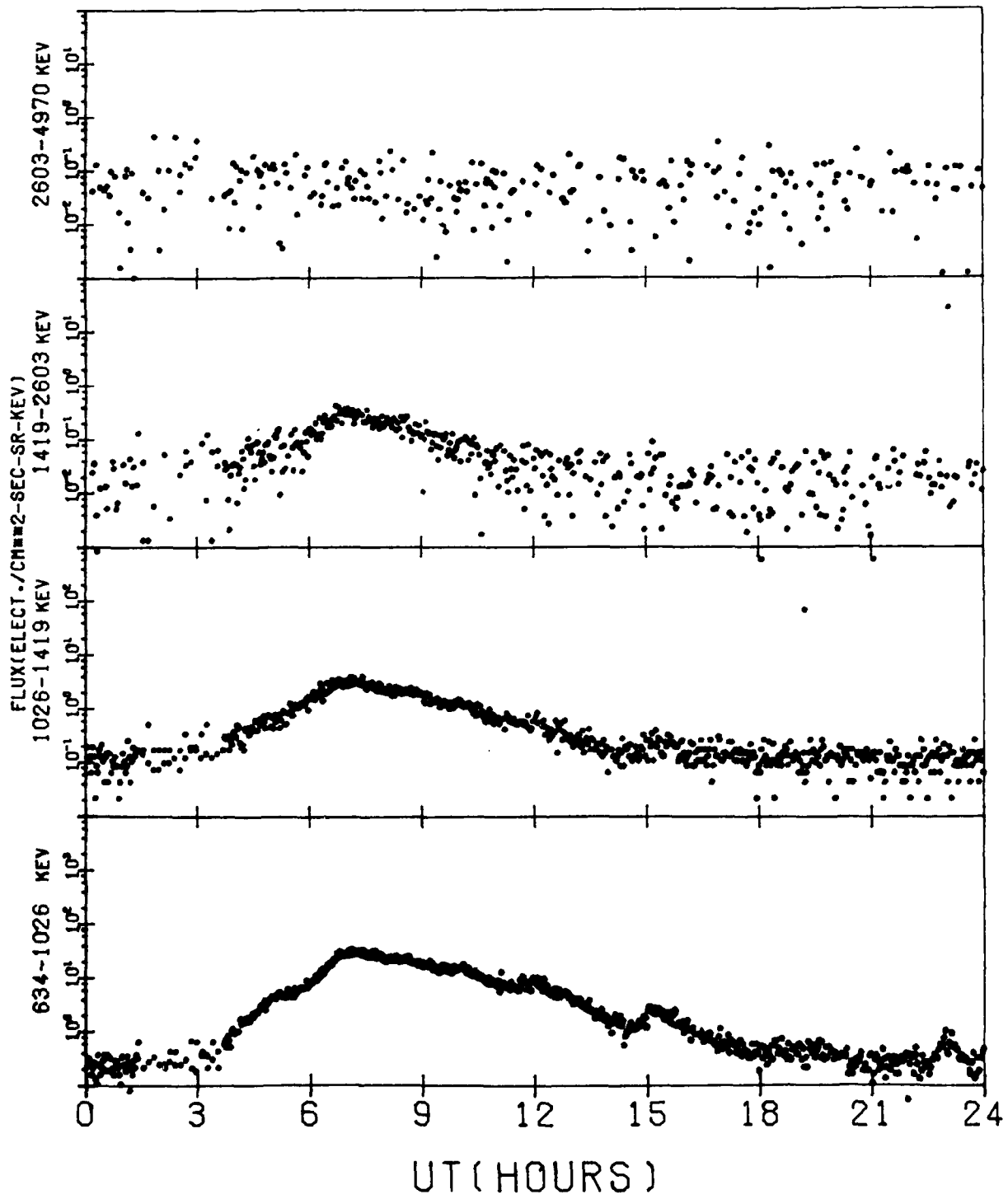
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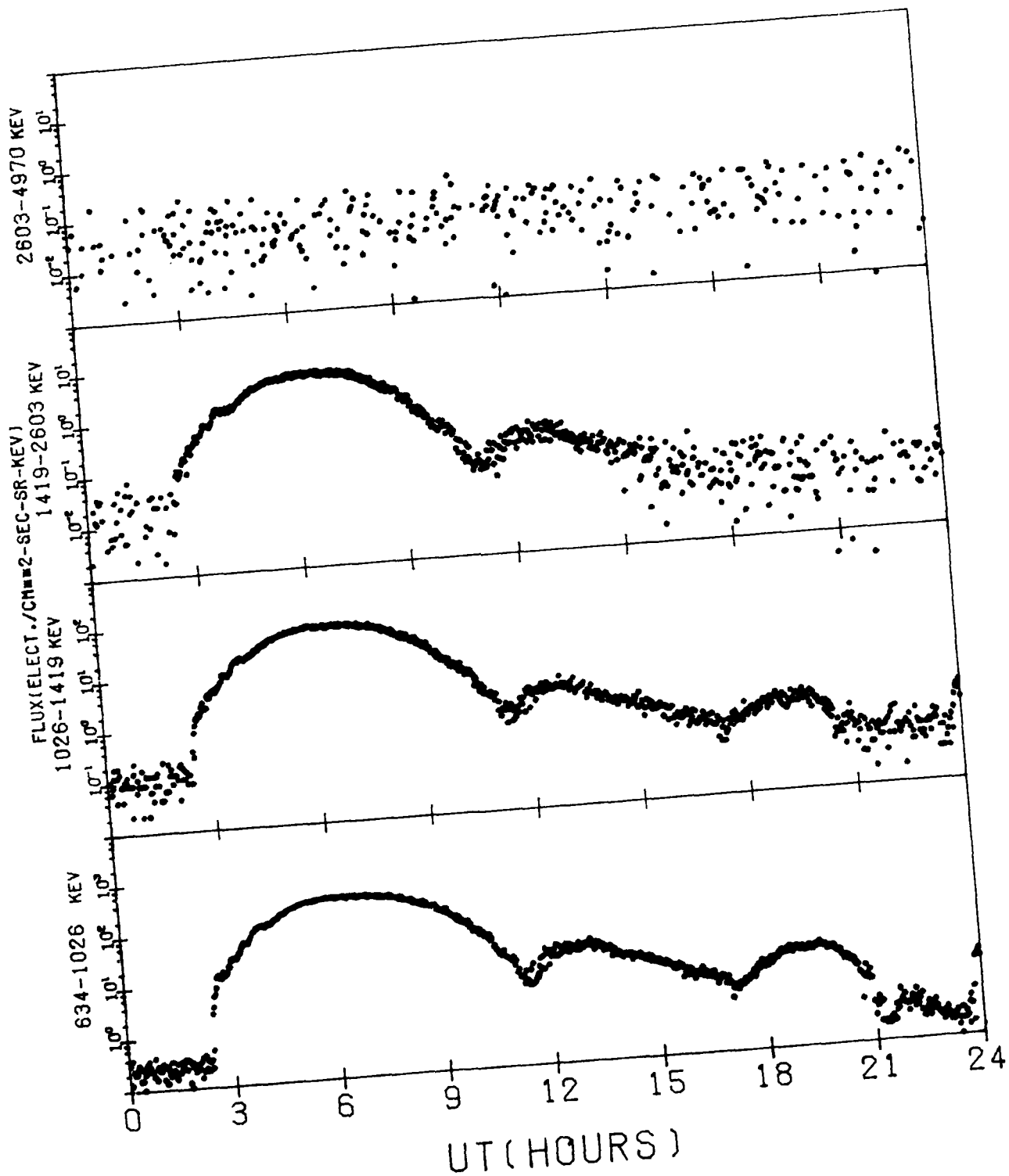
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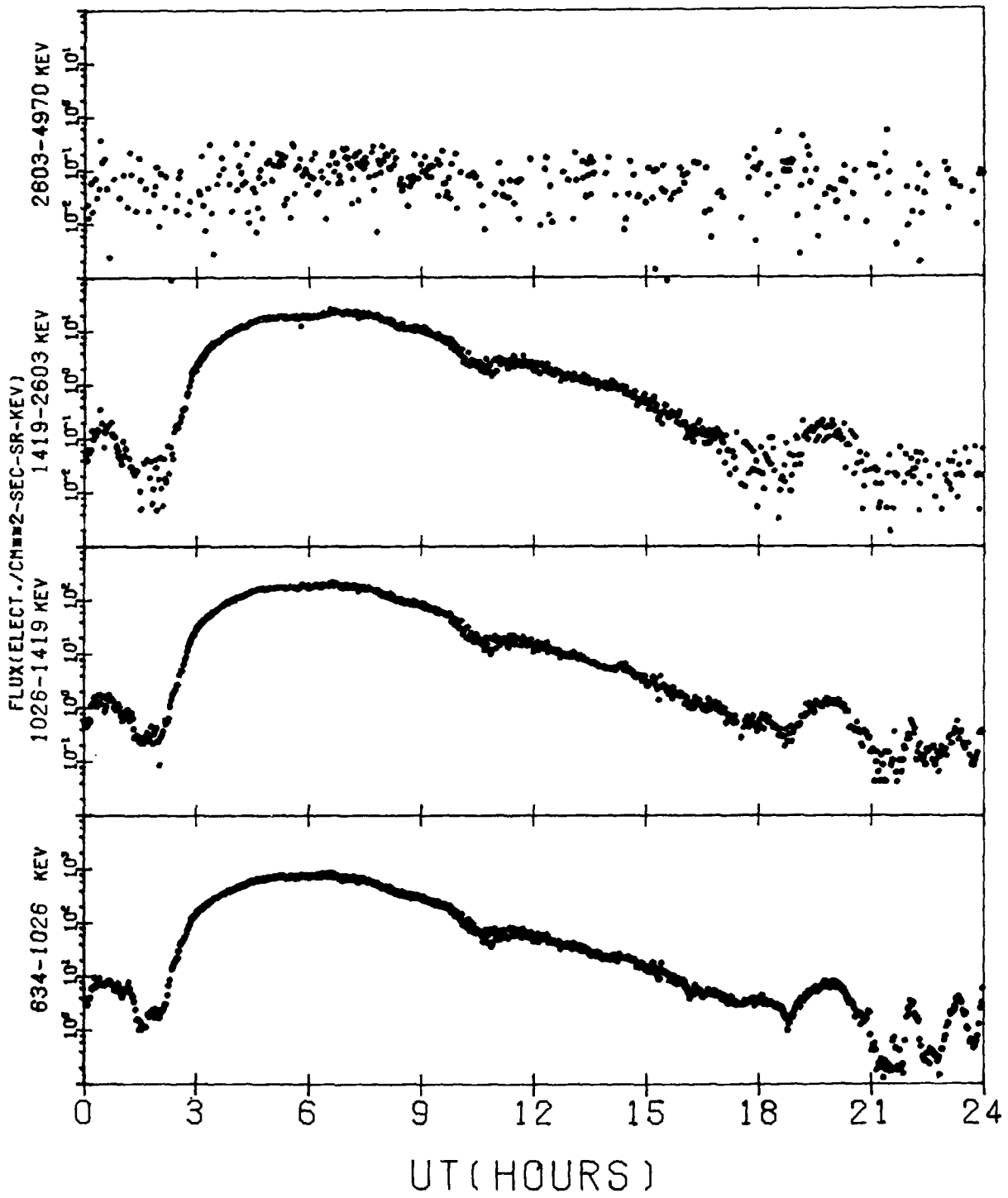
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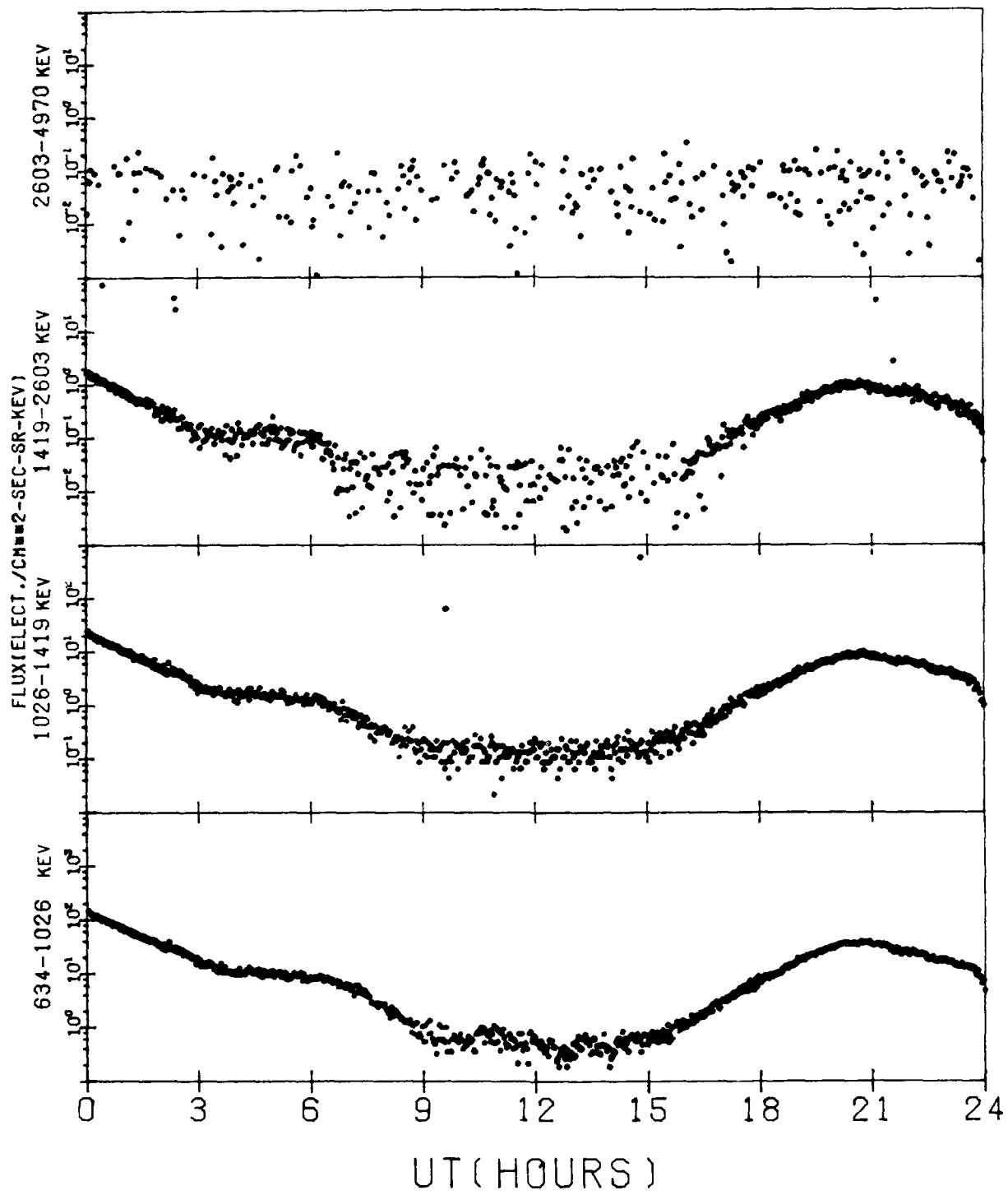
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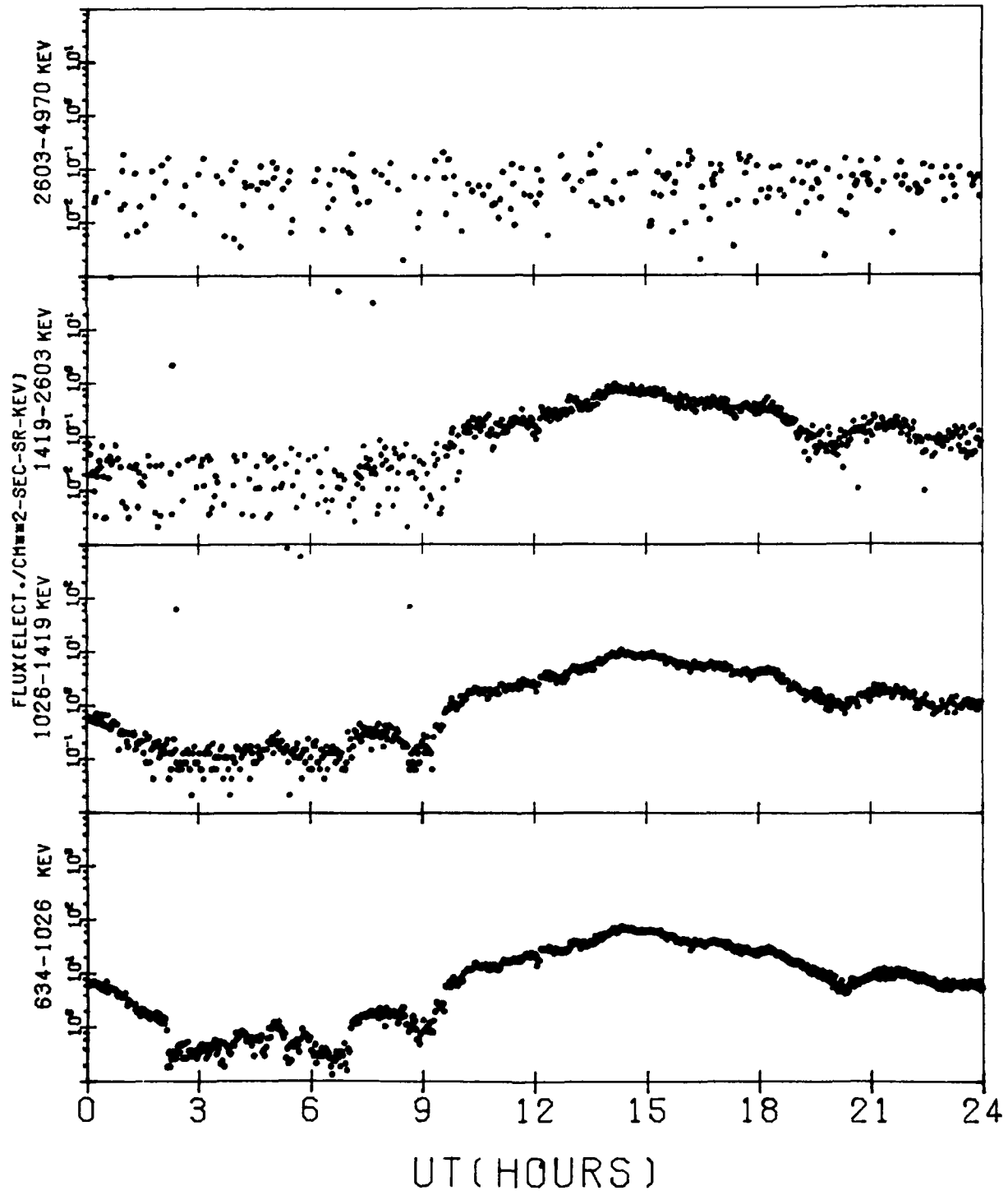
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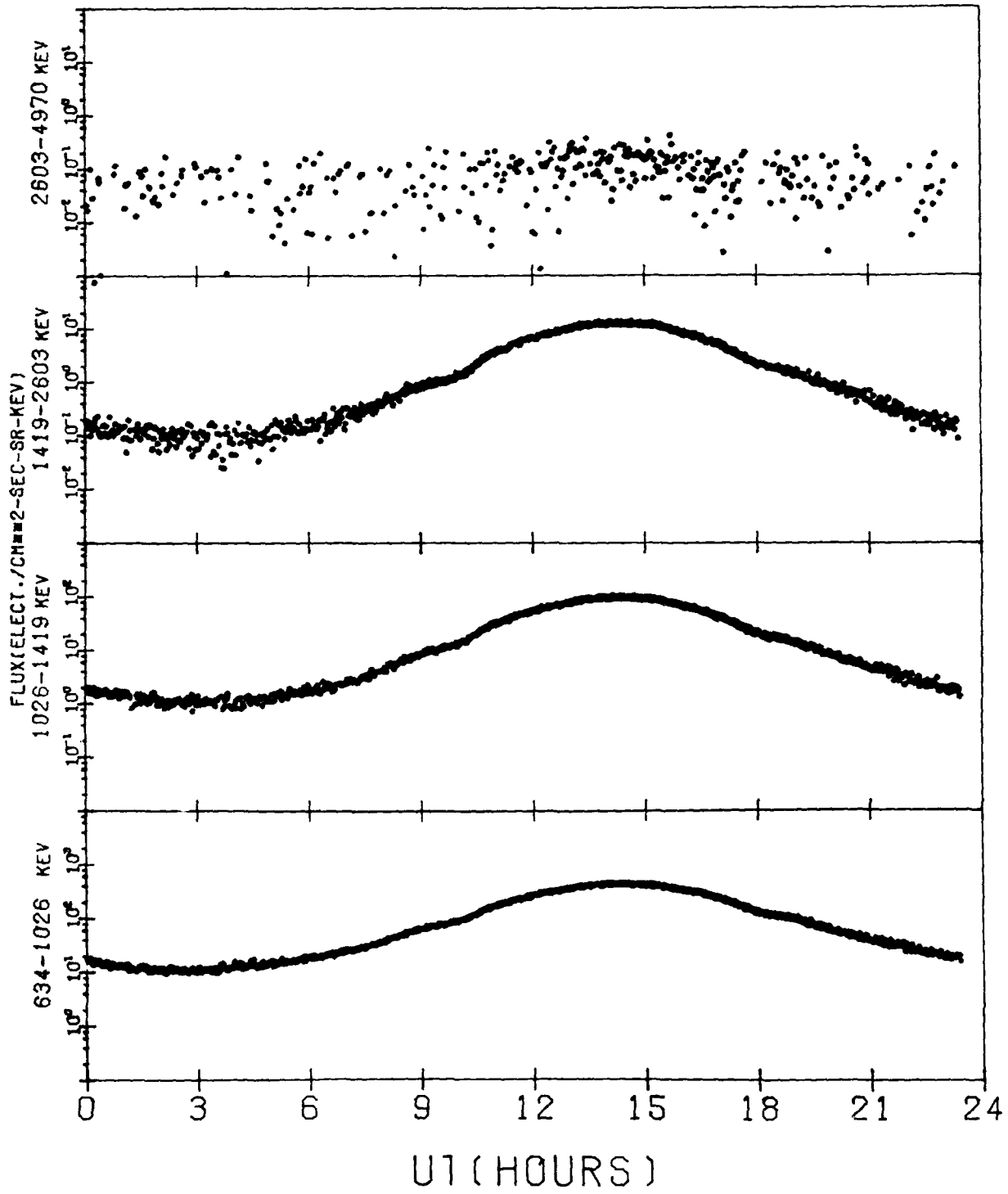
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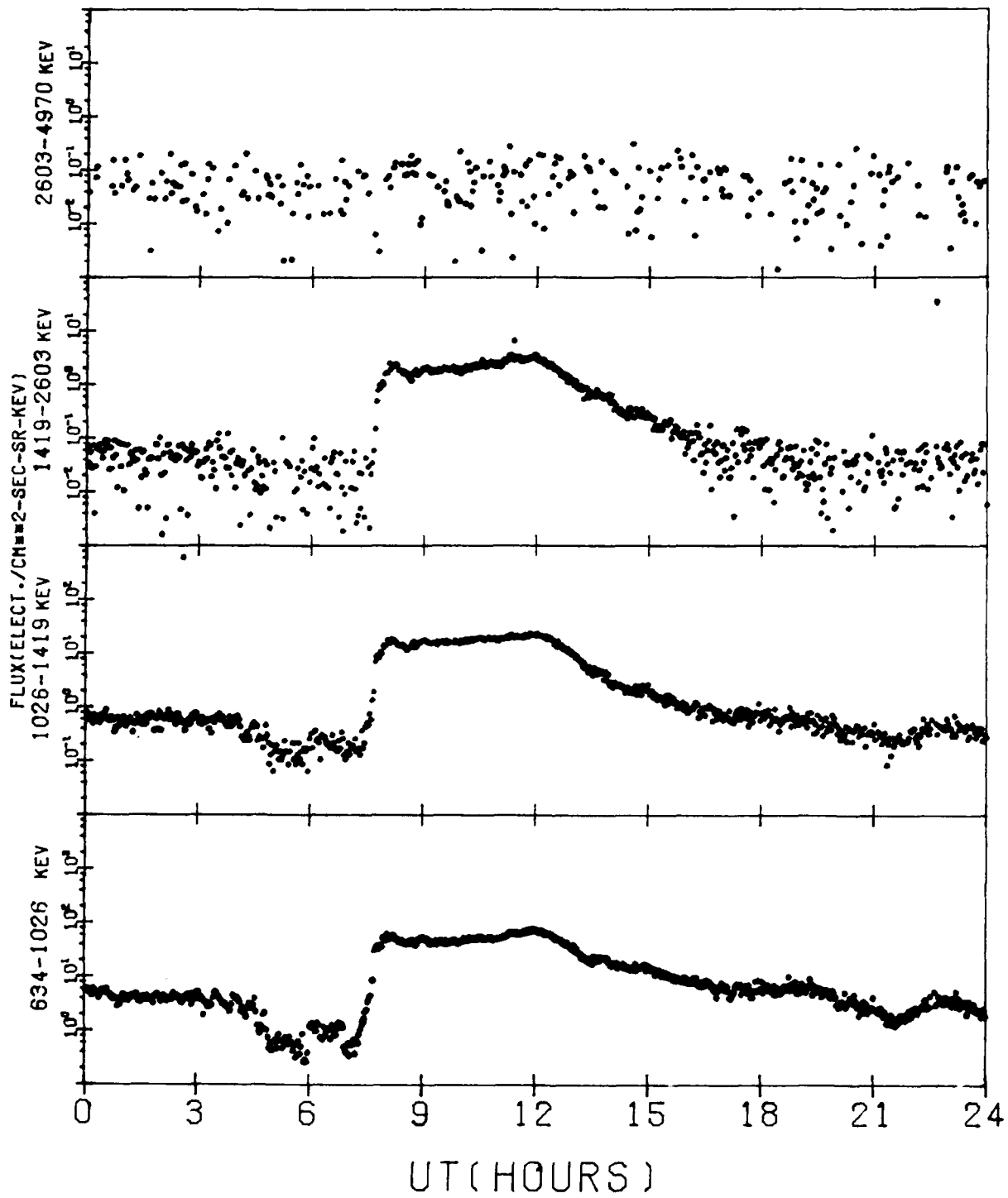
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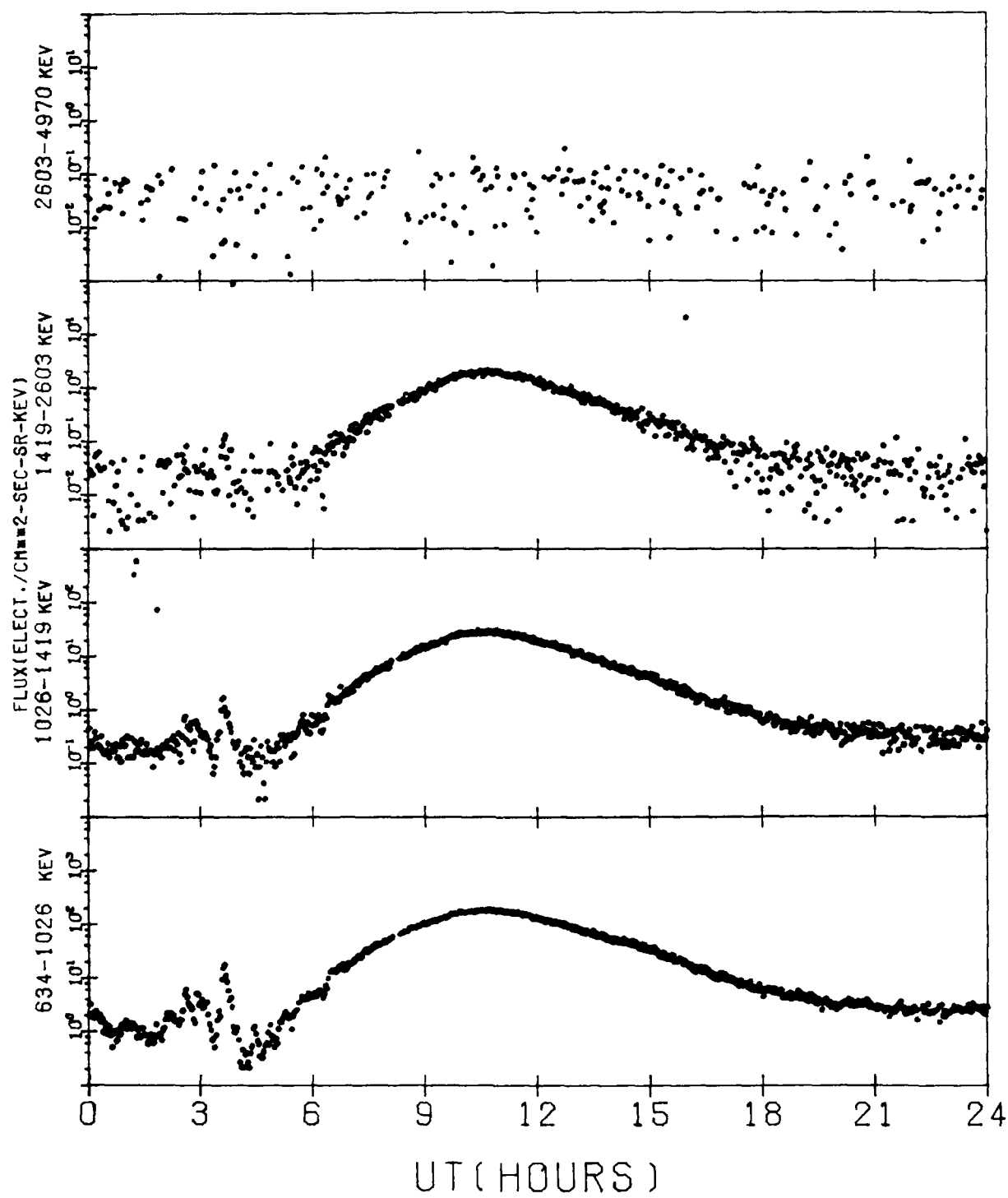
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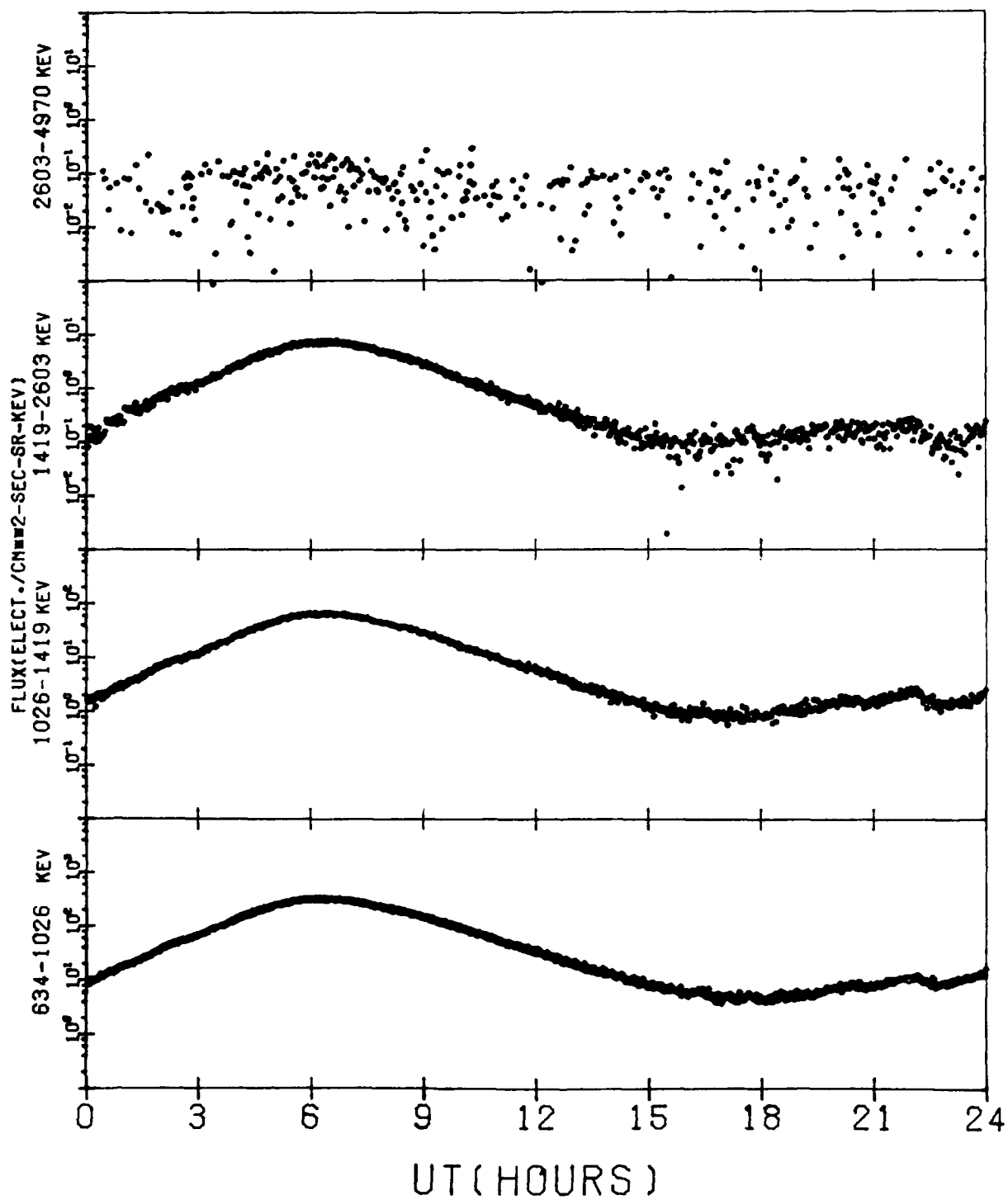
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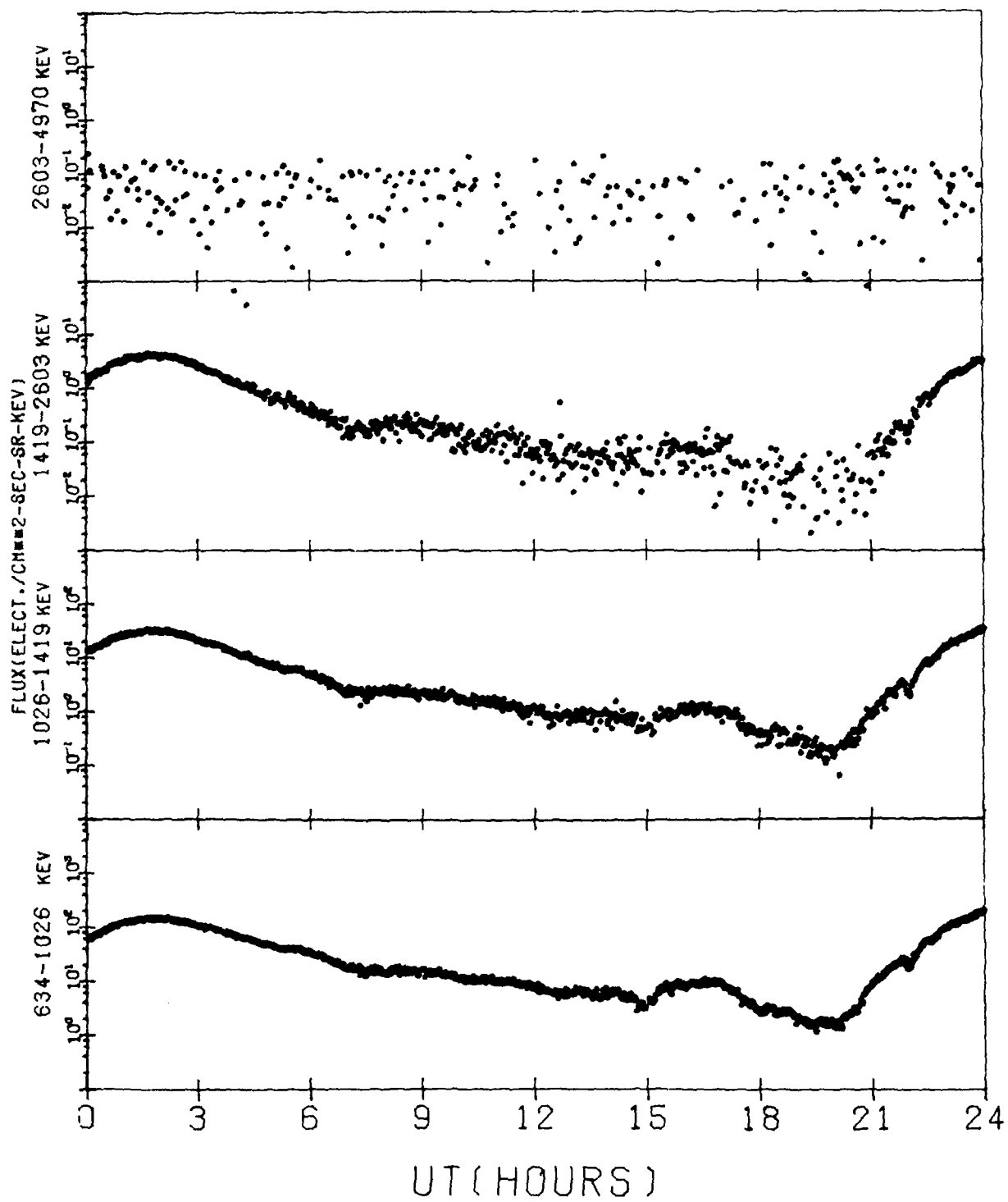
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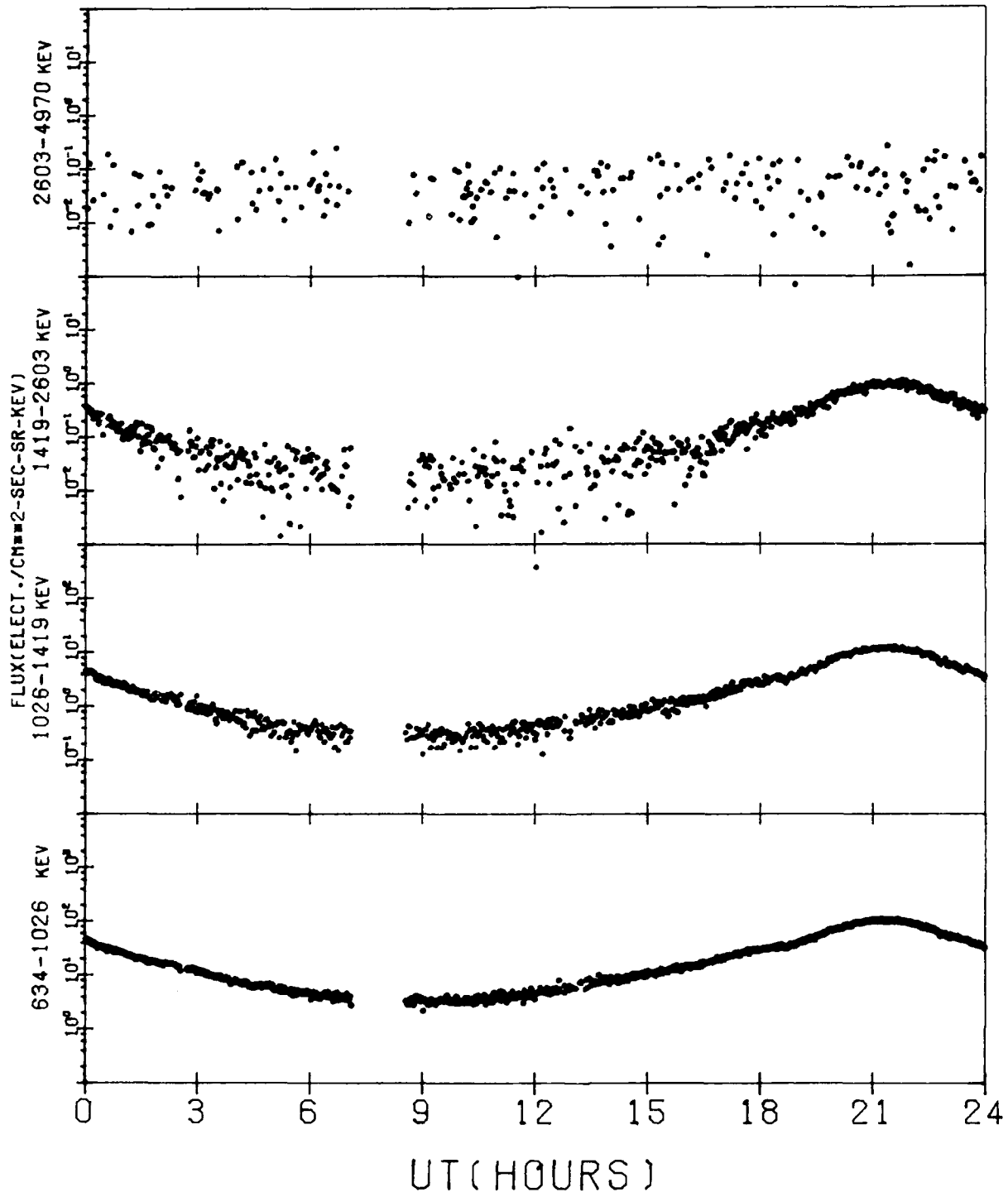
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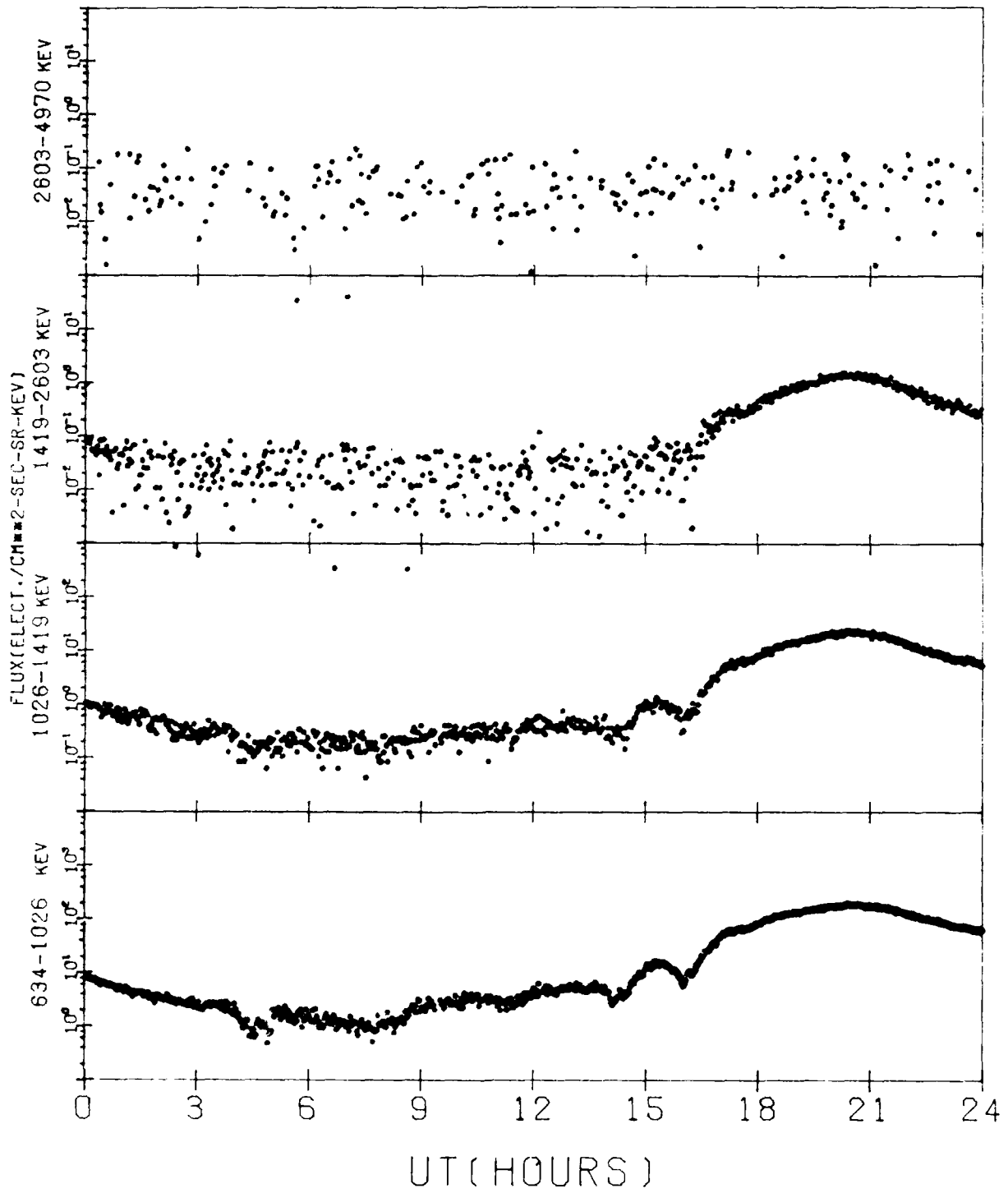
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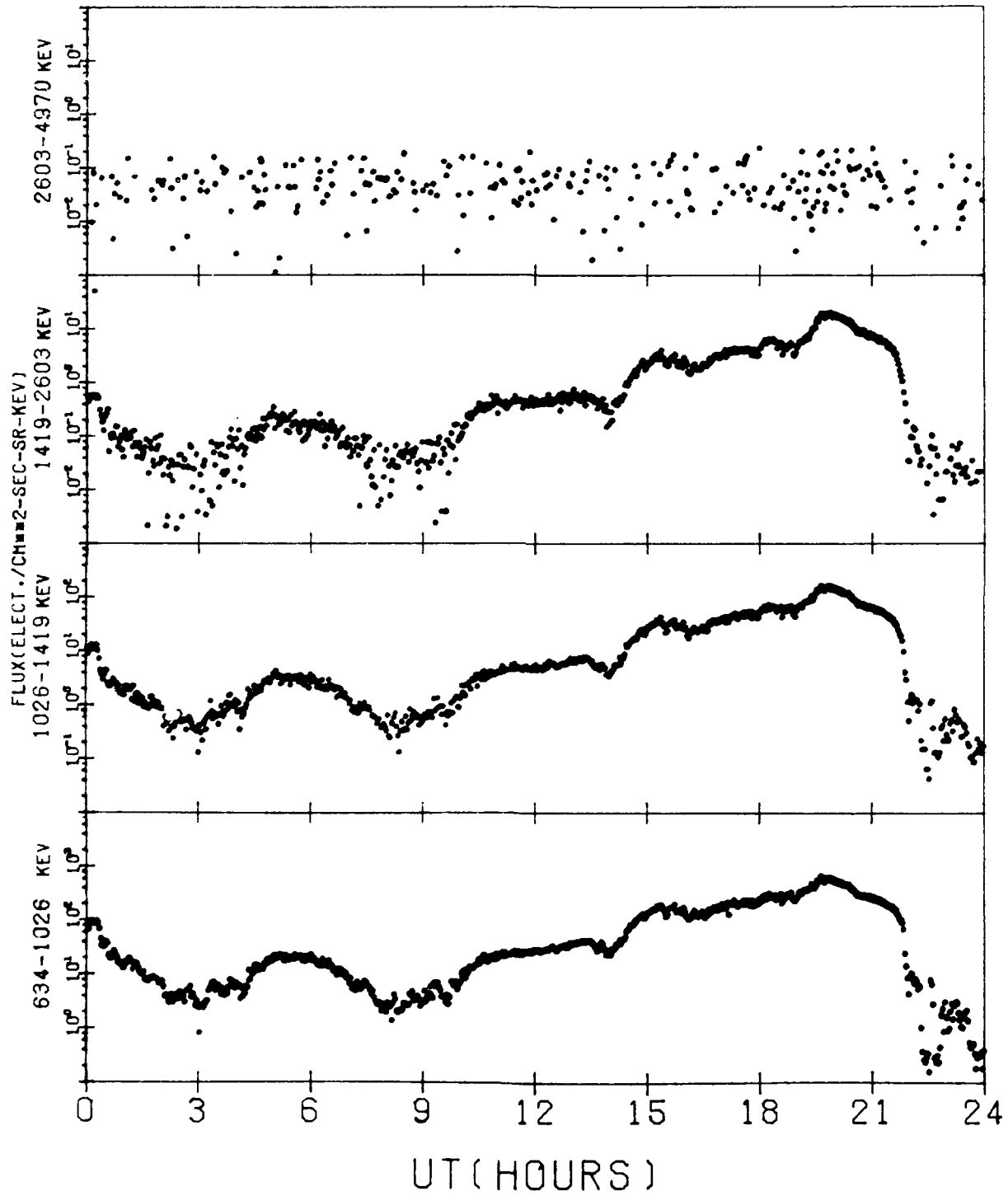
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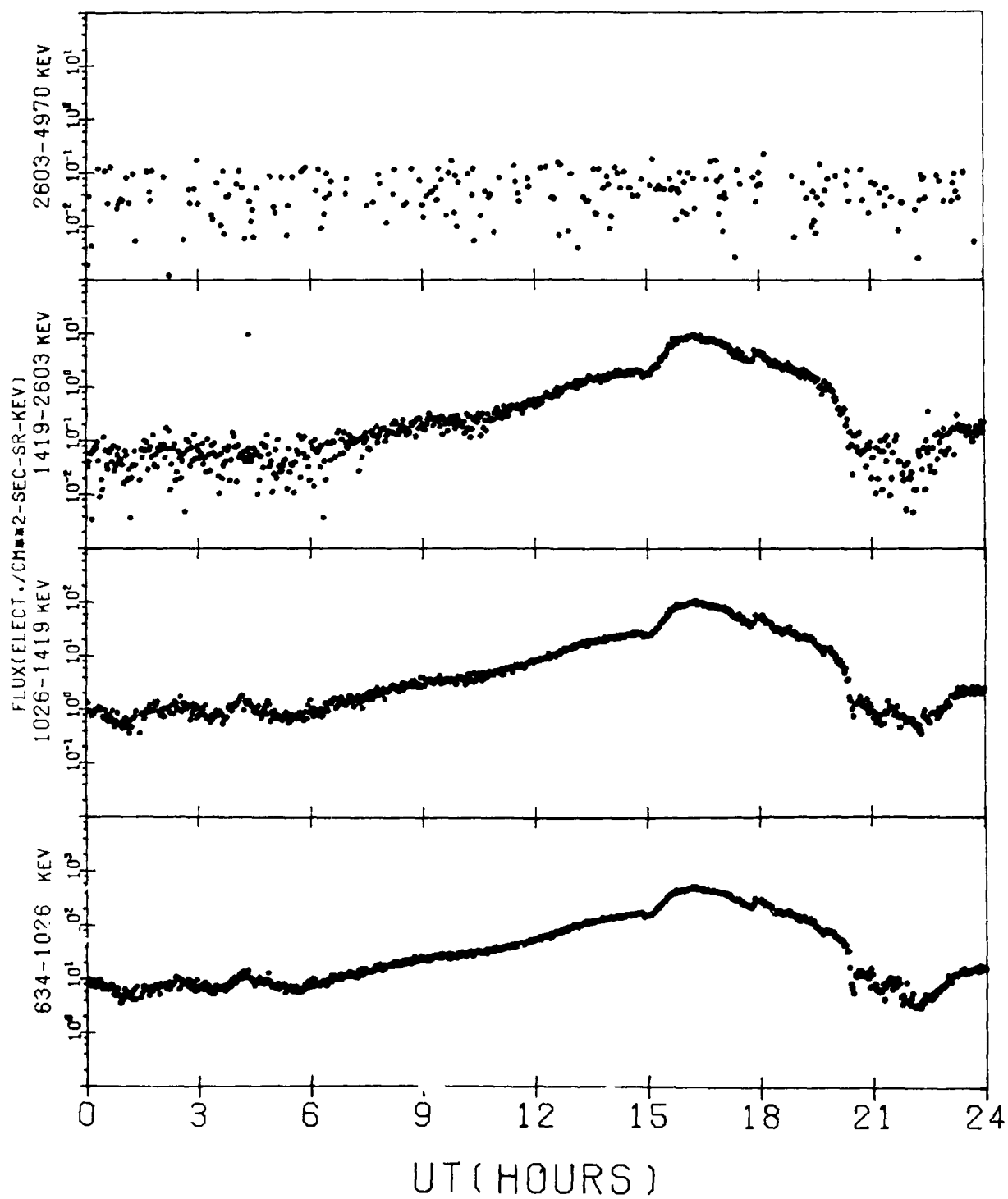
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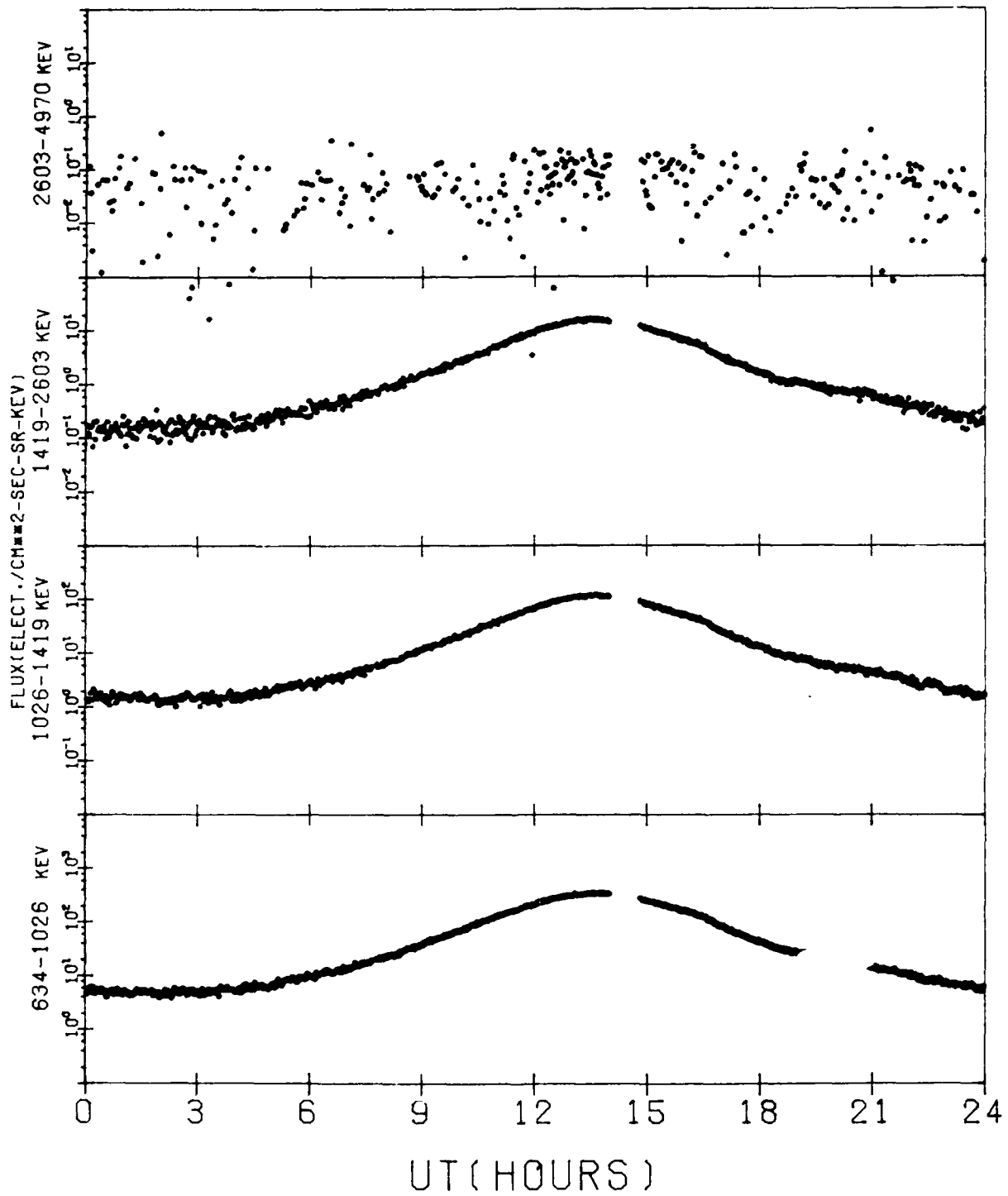
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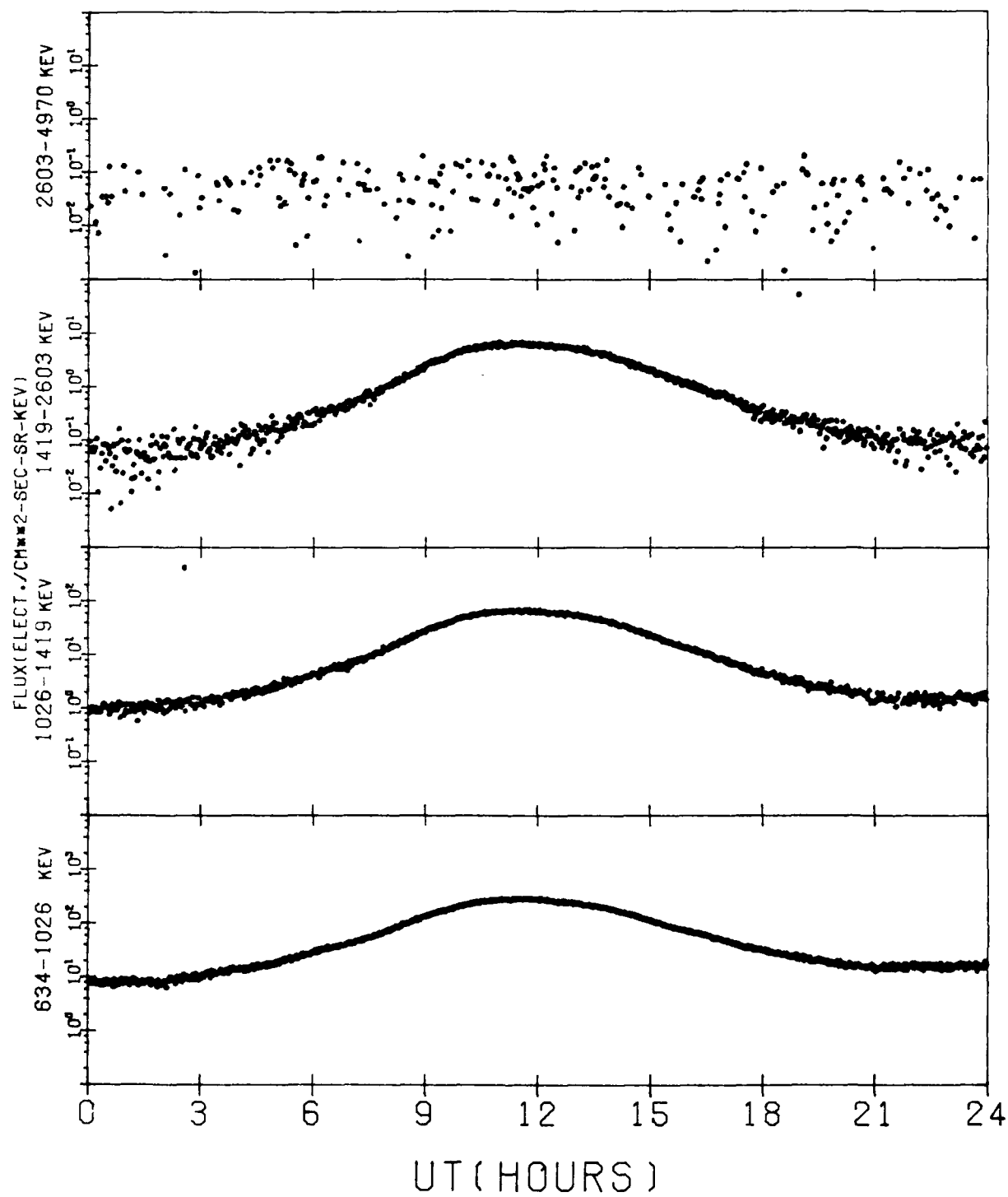
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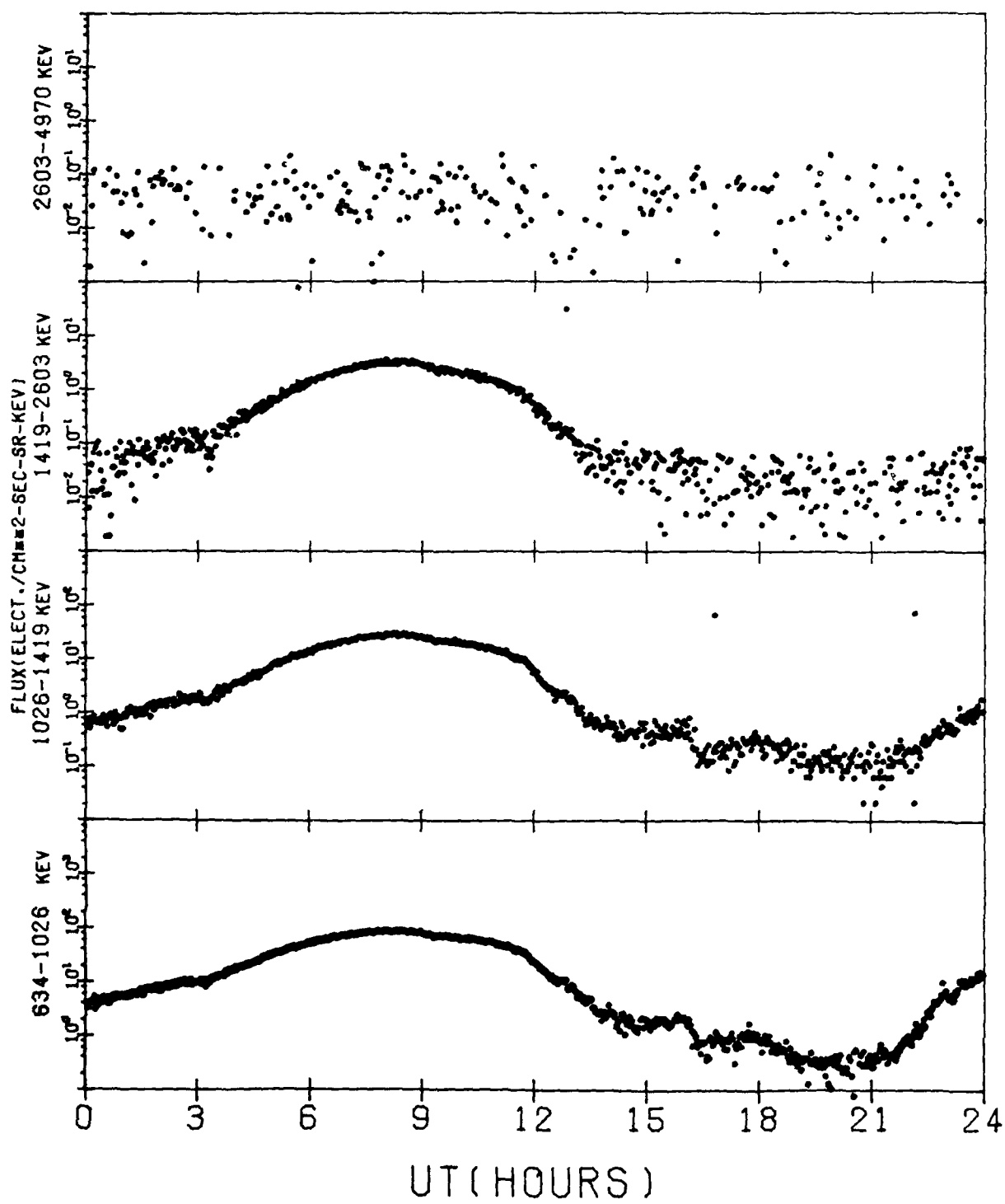
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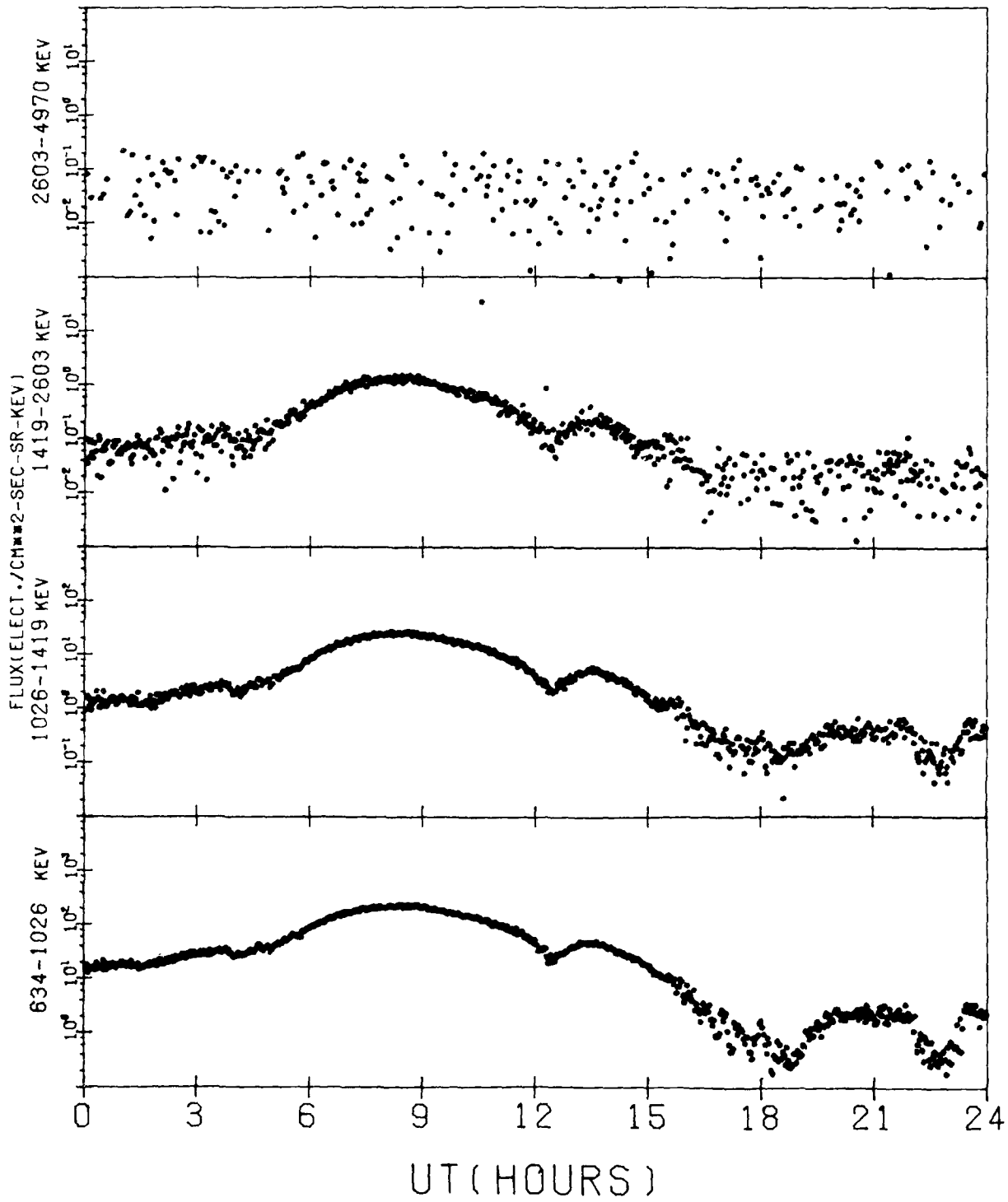
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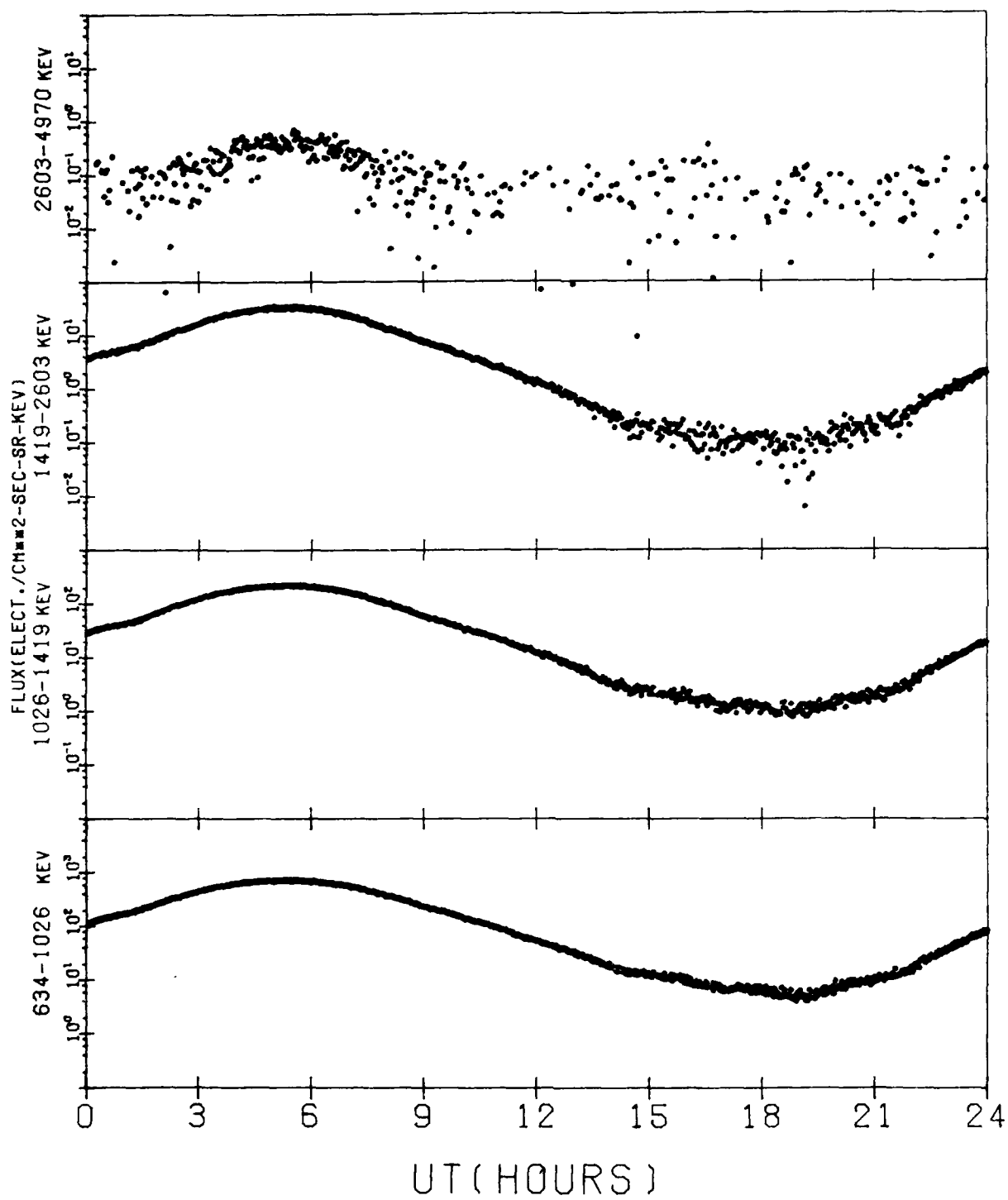
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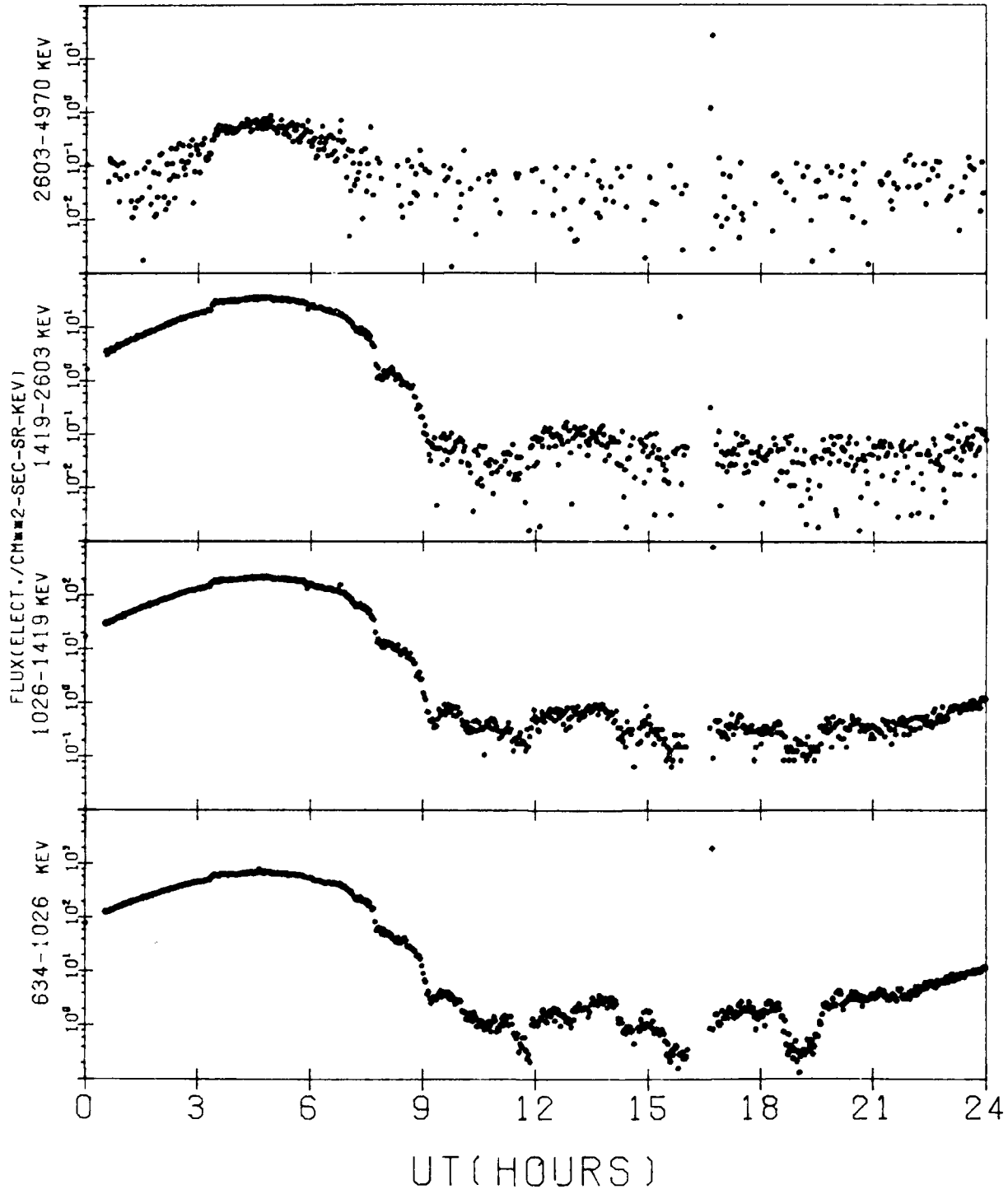
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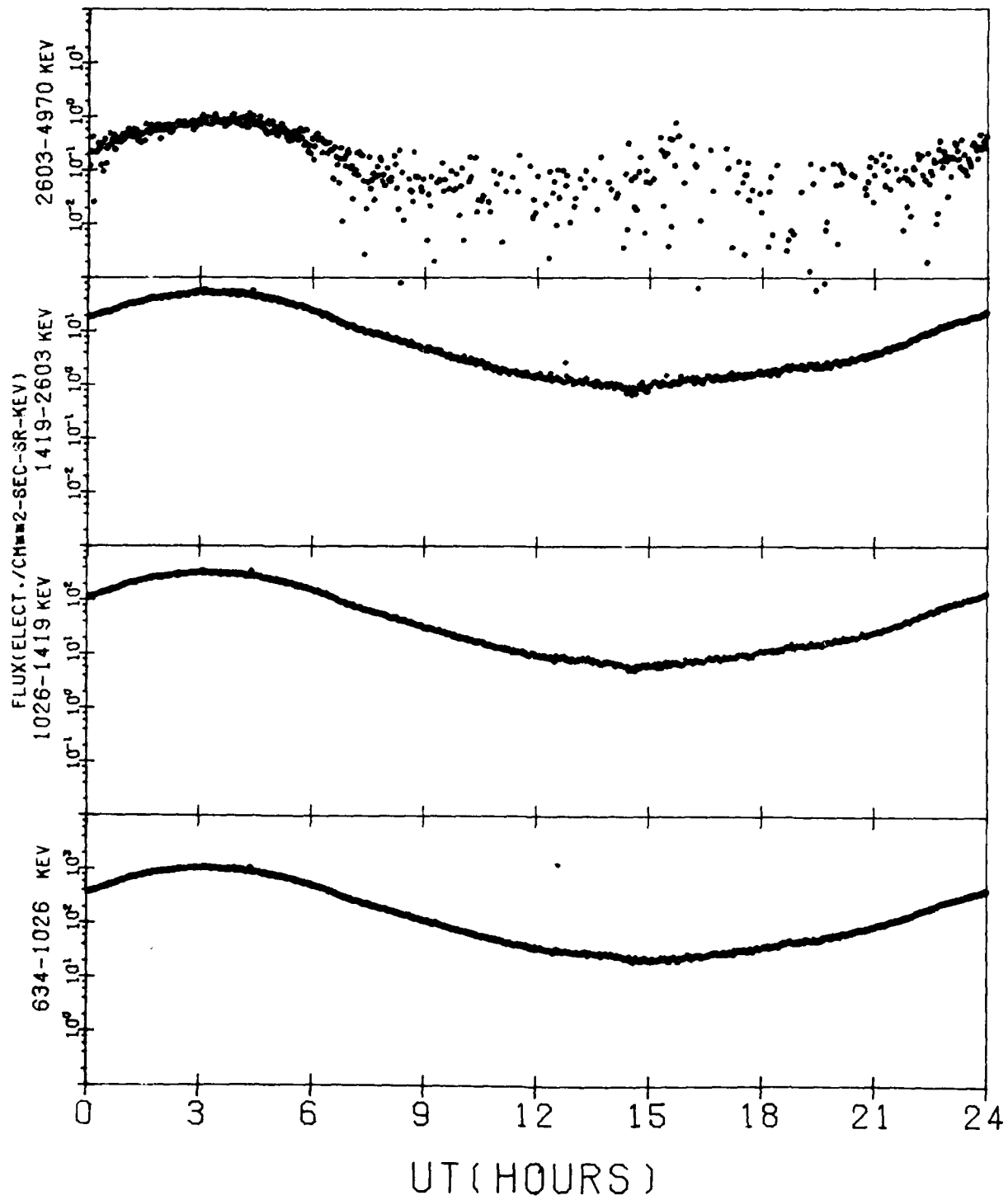
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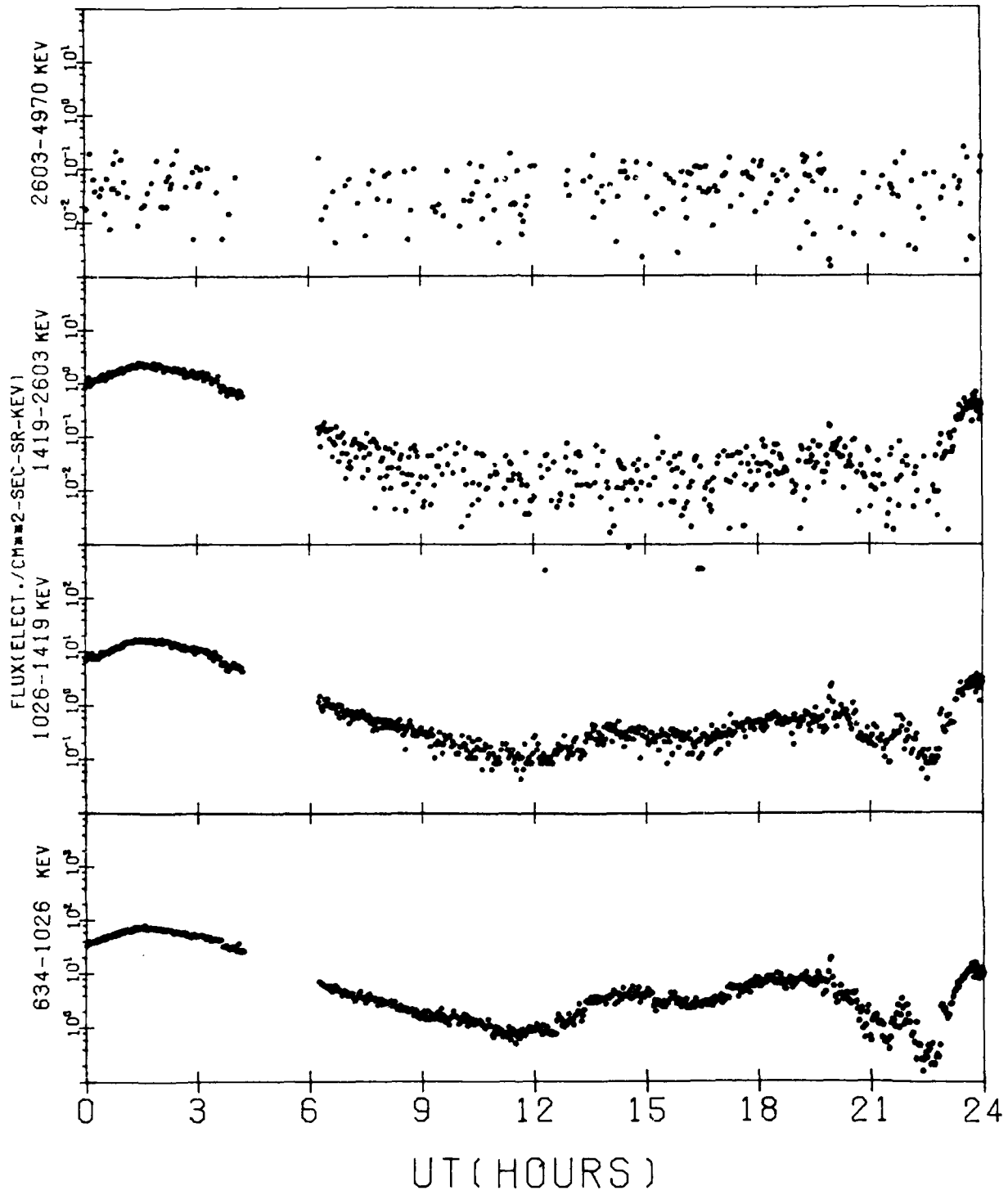
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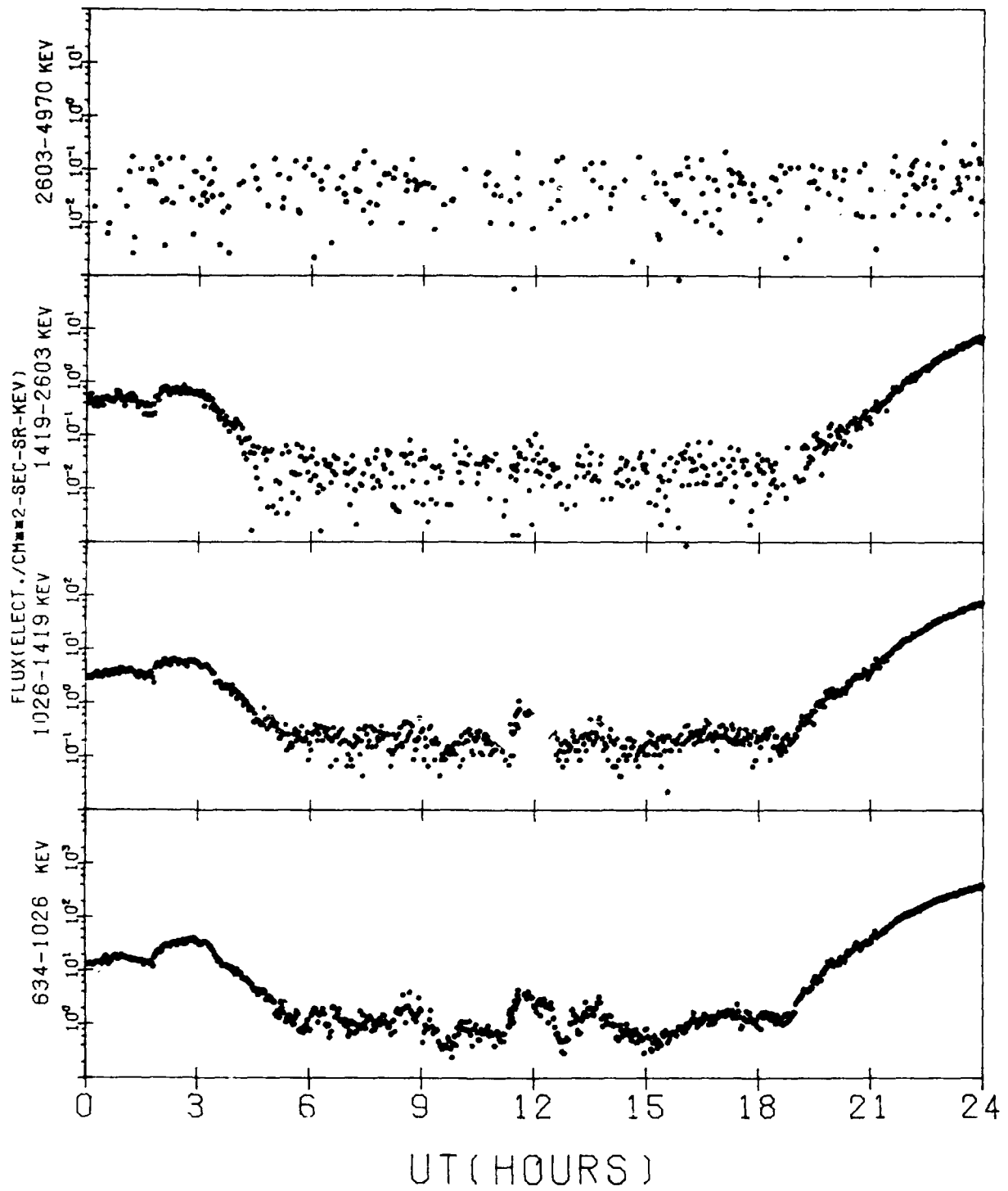
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SCATHA SC3 DAY 80046



SCATHA SC3 DAY 80047



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